

# The effects of different types of taxes and government expenditure on economic performance

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# *THE EFFECTS OF DIFFERENT TYPES OF TAXES AND GOVERNMENT EXPENDITURE ON ECONOMIC PERFORMANCE*

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## Dedication

This thesis is dedicated to the love of my life, Uriel, my son.

## *Abstract*

Local fiscal policy needs to take into account particular characteristics of a region and its level of development. Each locality has its own particular combination of resources, capabilities and needs. Firstly, this work estimates the impact of fiscal policy through a number of income and expenditure variables on output per capita growth and employment/unemployment using fixed-effects panel data econometric methodology in 32 states and 2,247 municipalities of Mexico from 1994 to 2010, and country data in 20 Latin American economies during the same period. Secondly, this analysis computes the impact on growth of the 1998 Federal Reform to the Fiscal Coordination System in Mexico, since it is the most significant reform in the decade regarding transfers from central to local governments. Finally, this research discusses the linkage between policy makers' perception, public finances and the local inhabitants' opinion regarding public services provided -considering a self-developed survey in the 32 Mexican states and Latinobarómetro surveys from 2008 to 2010.

The main result in this research is that local fiscal policy is inaccurate if it does not take into account income and expenditure components simultaneously when analysing the effect of fiscal policy variables on Gross Domestic Product per capita (GDP per capita) and employment/unemployment at a sub-national level. This research intends to be a pragmatic application of fiscal policy management. My work shows that the impact of fiscal policy variables is not equal among the different levels of government. My results are consistent with Devarajan et al. (1996) that find that current expenditure can boost growth in less developed economies, and the relationship between government capital expenditure and growth is negative in developing countries due to misallocations of public spending. The current study shows that the 1998 Federal Reform has a positive effect, particularly on low income localities in Mexico, while some negative effects in more developed municipalities. According to the results of my self-developed survey in Mexico during 2014-2015, government officials considered that fiscal policy had a significant effect on growth (up to 65%) and only (2-5%) thought it was not significant. With respect to the analysis of Latinobarómetro

surveys 2008-2010 for localities in Mexico, I utilise an ordered probit regression where the dependent variable reflects the response to questions regarding taxes, confidence and satisfaction of local services and the independent variables in my model are the fiscal variables. In my understanding, there has not been a similar exercise in establishing a relationship between taxpayer's satisfaction and fiscal policy variables. My results show a lack of confidence in the local government and poor taxpayer satisfaction with municipal services.

Overall, my research suggests that 1) policy makers need to account for local population needs and disparities to overcome regional inequalities; 2) a lack of local government capacity building and 3) relevance of institutional framework.

## *List of Abbreviations*

| | |
|---|---|
| CONEVAL | National Council for the Evaluation of Social Development Policy |
| ECLAC | Economic Commission for Latin America and the Caribbean |
| FAEB | Fund of contributions for basic education and Normal |
| FAETA | Fund and Technological Education of Adults |
| FAIS | Fund of contributions for the Social Infrastructure |
| FAM | Multiple contributions fund |
| FASP | Fund of contributions for Public Security of the States and the Federal District |
| FASSA | Fund contributions for health services |
| FE | Fixed Effects |
| FISE | Fund for State Social Infrastructure |
| FISM | Municipal Social Infrastructure Fund |
| FORTAMUN | Fund of contributions to the strengthening of municipalities |
| GDP | Gross Domestic Product |
| GMM | Generalised Method of Moments |
| ILOSTAT | International Labour Organization |
| IMF | International Monetary Fund |
| IMSS | Mexican Institute of Social Security |
| INEGI | National Institute of Statics and Geography |
| ISSSTE | State's Employees´ Social Security and Social Services Institute |
| IV | Instumental Variable |
| NAFTA | North American Free Trade Agreement |
| OECD | Organisation for Economic Co-operation and Development |
| OLS | Ordinary Least Squares |
| PMG | Pooled Mean Group |
| SHCP | Secretaría de Hacienda y Crédito Público |
| UN | United Nations |
| VAT | Value Added Tax |

# 1. Introduction

## *Fiscal Policy in the context of Mexican and Latin American economies*

After the great recession of 2008-2009 and considering 2016 modest development, growth is not enough to reduce inequality and improve citizens' well-being. Proper regulation and low policy uncertainty is necessary to enhance investment, growth, employment and an adequate and efficient allocation of resources. Fiscal initiatives should focus on reducing inequality, benefit people in need and try to overcome regional disparities, while keeping sound public finances. In this context, each country, region and locality requires its own meaningful and consistent policy package to improve productivity, synergies, growth, employment, and inclusiveness (OECD, 2017, p.2-5). Targeted and assertive fiscal policies need to be re-evaluated under the lenses of the particular characteristics of a locality, the interaction between resources, public provision, market structure and citizens´ satisfaction. Developing economies can be at risk if they do not implement accurate fiscal policy as a possible tool to stimulate the economy under a complex and dynamic macroeconomic scenario. Fiscal policies should be effective in order to apply countercyclical policies and local governments would have to promote plausible and well-designed institutional framework, such as fiscal rules, stabilisation funds, and medium-term expenditure agendas, which can help build fiscal space and fortify policy results (Huidrom et. al, 2016, p.1). Furthermore, efforts to strengthen the rule of law and fight against corruption, increase government accountability and transparency, coherent and realistic policy making, enhance public and private investment, training and coaching programs for workers can boost economic growth in the long-run (OECD, 2017, p.4-6). In a scenario of economic difficulty where income derived from non-renewable natural resources is decreasing in Latin American countries, the implementation of precise fiscal reform measures, the efficient use of available resources that guarantees the satisfactory provision of public services and an adequate institutional framework is imperative to promote economic growth (ECLAC, 2016, p.5-7).

Considering that neoclassical growth theory is simplified and contains theoretical assumptions as perfect competition and constant returns to scale that do not hold in real life, it is much more sensible to consider that economic growth is an endogenous consequence of the interaction of several variables within the economic system, where private and public sector play a key role in the development of the economy (Romer, 1994, p.3). Every day public policy decisions do not come with a manual of precise assumptions, statistics and data; however, it is possible to use the available evidence in a pragmatic way in order to understand the institutional framework and the determinants of growth. The aim of this thesis is to analyse fiscal policy with a realistic approach.

In the extant literature, several growth studies focus either in the income or in the expenditure side when analysing the development of economies. Moreover, due to the lack of availability of data and time series, previous studies have predominantly focused on developed economies at a country level. Considering income studies, Ormaechea (2012), Johansson et al. (2008) and Angelopoulos et al. (2012) find that reducing direct taxes while increasing indirect taxes have a positive impact on growth. However, Huang and Frentz (2014) find that there is no clear evidence that tax increases harm growth, particularly at a state level (p.8, 10). Arvate and Rocha (2013), Kappeler et al. (2013) and Binswanger-Mkhize et al. (2012) illustrate the positive effect of transfers on growth and local investment. Regarding expenditure research, Guillemette (2010), Angelopoulos et al. (2008), Nijkamp and Poot (2004) and Bose et al. (2003) find positive growth effects of productive expenditure for transport & communication, education & health, research & development. Only some authors have considered the simultaneous development of income and expenditure variables as Gemmell et al. (2012 and 2009) and Kneller et al. (1999). This current study recognises the importance of considering both set of variables in the balance sheet (available resources and sources of funding) when analysing localities in Mexico. Specifically, this work stipulates that effective local fiscal policy needs to take into account particular characteristics of a region and its level of development. Evidence presented in this thesis, suggests that each locality has its own particular combination of resources, capabilities and needs. Furthermore,

as an innovative approach, this study discusses the linkage between policy makers' perception, public finances and the local inhabitants' opinion regarding public services provided in Mexican States.

The importance of public finance to promote the development of localities has been widely discussed in the literature (Rosen, 2002, p.4). Economic development refers to all economic activities within a locality which promote higher growth and investment, an adequate allocation of resources, better distribution of income, equity, efficiency, welfare as well as the wellbeing of the population. Hence, in this study I focus on growth in 32 states and 2,247 Mexican municipalities, and in 20 Latin American economies from 1994 to 2010, measured as GDP per capita with the limitations of data availability. The selection of Mexico at 2 different levels of government and Latin American economies refer to developing countries with similar economic and geographic characteristics, where the allocation of limited public resources is essential for policy making decisions. After Latin American colonies achieve their independence they become primary-exporter economies, however, during the XX century, they implement policies of industrialization by import substitution; and in the 1980s-debt crisis enforce reform policies which generate a new socio-economic structure in the region (Hidalgo A., 2000). This work considers the relevance of understanding the dynamics of fiscal policy in the region as a geopolitical and geo-strategic scheme at a subnational level, particularly in Mexico, where the analysis is focused on the 32 states and 2,247 municipalities. This thesis corroborates the complexity and heterogeneity at a local level in the region, in clear divergence from developed economies. The period of study begins in 1994 because it is when the North American Free Trade Agreement (NAFTA) is signed between Mexico, Canada and USA, and ends in 2010 because in 2011 the implementation of different accounting practices between municipalities, states and federal government in Mexico takes place. Although the General Law on Government Accounting, which applies to all levels of government was approved by the Congress in December 2008 as a base to harmonise accountability, its operation gradually applies during 2009 when the new Federal Accountability Law is introduced and in 2010 when the accounting

framework and regulations are delineated so that in 2011 entities would be able to begin the accounting registration in a harmonised way (Khagram and De Renzio, 2013). Additional reforms take place in 2012 in order to establish the parameters to determine indicators and compliance goals. More accurate financial, programmatic, budget and fiscal reporting takes place between 2013 and 2015. In 2016 the full accounting, programmatic and budget legislation and harmonization among states and municipalities is formalised.

As it will be further demonstrated, the significance of fiscal variables will increase, the lower the level of government, thus, at a municipal level, this works finds surprising results, while at a country level, the significance of fiscal variables is lost due to combining countries with different context and circumstances, regardless of having similar level of development. This research considers that an effective fiscal policy should focus on the simultaneous analysis of the main components of income and expenditure, since the traditional measurement of primary and operational balance is not sufficient for understanding the way resources are derived and channelled. Likewise, it is essential to take into account the particular characteristics of a certain locality in order to implement an accurate fiscal policy.

As mentioned earlier, there are two main streams of economic thought related to the role of fiscal policies on growth. On the one hand, there are neoclassical growth models (Solow 1956) which do not recognize a long-term impact on growth from fiscal policy manoeuvring and on the other hand, endogenous growth models that consider human capital, technology and innovation relevant to growth development and therefore there is some scope for fiscal policy planning (Kneller et al. 1999, p, 171-173). This current study refers to the latter and the importance of including the main components of income and expenditure when evaluating fiscal policy impact on GDP per capita growth and employment.

The means of financing the provision of goods and services in a locality, in the different layers of government, is relevant for the development of a healthy and

sustainable budget. On average, transfers from central to local governments in 14 Latin American economies increased from 2.3 percent of GDP in 2000 to 3.9 percent in 2014, while own source income accounted for 2.6 and 3.2 percentage points, during the same period. Revenue from property taxes has remained stable in around 0.4 percent of GDP between 2000 and 2014. In 9 Latin American countries, where information was available, local taxable income has been in the range of 2 and 5 percent of total taxable income in the countries analysed with the exception of Argentina, Brazil and Colombia (15 percent). The poor evolution of subnational taxable income relates to the weakness and structure of tax bases and taxing power. Mostly, taxable income at a subnational level in Latin American economies refers to taxes on immovable property, taxes on consumption, taxes on production and services and taxes on motor vehicles (OECD, 2017 p.130-148).

During 2014 in Mexico, for instance, more than 8 percent of GDP belongs to transfers from central to local governments. Particularly, payroll taxes are an important source of local Mexican income, which account for about 41 percent of total subnational income, while taxes on immovable property signifies 23 percentage points and taxes on the use of goods and services represent 13 percent of local income. Although the administration and monitoring of payroll tax is easy, it inhibits formal employment. Concerning property taxes, cadastral registration and valuation is responsibility of each municipality. The Mexican Constitution establishes that localities are able to collect additional taxes, division, consolidation, translation and improvement of immovable property. Tax on motor vehicles (transferred exclusively to local governments in 2012) has represented a stable basis of revenue, since the increase of the number of cars is similar or greater than population growth and it relates to individuals with higher purchasing power (ibidem). As it will be analysed in chapters two and three, indirect taxes do not affect relative prices and present a higher burden for low income families because the marginal propensity to consume decreases when income increases, hence high-income families utilise less proportion of income for consumption. The impact is not the same among regions which have distinct patterns of consumption. High income states reflect a positive impact on growth,

while at a municipal level middle and high income reflect a positive impact as well. Although, property taxes have been raised, they have not been exploited at their full potential so there is an opportunity to use them to increase local revenue.

Considering that indirect taxes are neutral with respect to the decision of present and future consumption, and do not punish or reward savings and investment, then, when the tax burden increases, growth can be achieved if the government strengthens the capacity of public spending thinking of the dynamism of thriving sectors, which, in turn, require stimulus to consolidate their positive tendency (Henríquez, 2014). Although the increase in indirect taxes penalises consumption and business margins, it achieves its main goal to raise revenue, particularly in high income states and municipalities where the overall capacity and infrastructure is larger than in low income localities.

Nations and provinces face enormous challenges in a complex and dynamic environment (Auerbach *et al.*, 2009). In a scenario of fiscal austerity where income derived from non-renewable natural resources is decreasing in Latin American economies, the efficient use of available resources and fiscal reforms is imperative. Expanding the tax base has become relevant but also increasing the effective tax paid by the highest decile of income in order to diminish inequality, since capital effective tax is lower than labour effective tax. Between 2011 and 2015 the highest decile burden in Latin America has been on average around 6 percent, in contrast with 25 percent in European countries. The fiscal strategy should also focus on accountability, transparency, effectiveness of tax collection at a local level, particularly in relation to property tax, reduction of inefficiencies of public spending, promotion of a tax culture and fight against tax evasion and fraud. In 2014, non-compliance accounts for 2.2 percentage points of GDP in value added tax and 4.1 percent in income tax; and even in some countries, corporate tax evasion can reach 70 percent. Fiscal manoeuvring shall prioritise investment that enhances growth and minimizes volatility in the provision of public goods and services. Furthermore, the use of new

technologies can facilitate the audit and control of taxpayers and at the same time improve transparency and accountability of public spending (ECLAC, 2016, p.5-7).

Tax reforms have increased domestic revenue by utilising specific taxes, expanding the tax base, improving tax administration and promoting transparency, therefore, taxable income has augmented 0.2 percentage points of GDP. Although Mexico has a higher GDP per capita than other Latin American economies, tax revenue is lower than other countries with similar level of development. Likewise, tax revenue in Latin America is half of the European Union and 15 percentage points below OECD countries between 1990-2014. In this same period, Latin American direct tax revenue accounts for 4 percentage points and indirect tax revenue comes to 9 percentage points of GDP. During 2015, for instance, capital spending decreased in 12 Latin American countries. Oil producing economies reduced public investment by 1.4 percentage points of GDP, while food production countries decreased by one percentage point. On average, in 2015, after several years of continuous current spending increase, oil producing economies declined this type of expenditure by one percentage point of GDP, nonetheless, food production nations present a significant rise in current spending. Further actions have to be undertaken in order to establish a clear separation of current and capital expenditure, enhance investment and restraint current spending. Improve efficiency in the procurement processes and performance in the acquisition cycle. Make and exhaustive revision to ongoing subsidies and transfers (ECLAC, 2016 p.5-65).

Subsidies to producers or consumers have been utilised to promote specific agricultural or industrial activities, employment, research, education, art or culture, but they are not always transparent or justifiable. Industrialised countries focus on agricultural, transport and manufacture activities, while developing economies use them for energy, water and primary activities (Pearce, 2003). In this study, subsidies exhibit a positive impact in middle and low-income localities and although I don´t differentiate among several types of

subsidy, the message is clear, they are positive for localities with lower level of development and thus, necessary to overcome regional disparities. Subsidies have redistributive goals; however, it is desirable to achieve a balance between the benefits they provide to specific sectors and their cost. Low income localities can be subsidised for a certain period of time until they reach a better level of development. Local governments have to be cautious on which sectors of the local economy could be enhanced in order to promote economic activity and growth by lowering the cost of production to the local producers so that they can increase output.

In this respect, when implementing subsidies, governments should be aware of their purpose and design, beneficiaries, types or nature, instruments, the way they are channelled, the market distortions and evaluation (Steenblik, R.,2003). It is important to consider subsidies only for a specific timeframe, otherwise, they can affect private investment, consumption and local development in the medium and long term; thus, assistance programs foster unproductiveness and lack of innovation (Clements et al., 2013). In June 2016, considering regional disparities in Mexico, the Federal Law of Special Economic Zones was promulgated to stimulate economic growth, reduce poverty, grant the provision of basic services, and broaden the opportunities in the low development regions of the country, through the improvement of investment, production, distribution of income, competitiveness and employment. Benefits will be temporary (minimum 8 years) and will decrease with time.

Reforms to improve the fiscal intergovernmental relations among different levels of government diminish volatility in the provision of public services and guarantee the maintenance of basic infrastructure. Solid institutions, accountability, integrity, transparency and macroeconomic stability in times of negative economic shocks could contribute to a better provision of public services (ECLAC, 2016). Corruption and quality of bureaucracy determine the quality of governance and have a sizable impact on public spending effectiveness and efficiency. Therefore, public spending does not necessarily produce the

expected outcomes and the empirical differences in public expenditure can be explained by the quality of governance and developing countries in particular have poor governance (Rajkumar, A. and Swaroop, V., 2008). D'Agostino et al. (2016) show in a panel of 106 countries that there is a strong and negative impact between corruption and investment, hence policies that reduce corruption would have a positive impact on growth. Developing countries with ineffective governments could benefit from public investment since private investment would be discouraged and government investment could be a substitute for private investment (Butkiewicz, J. and Yanikkaya, H., 2011).

As it will be analysed in the subsequent chapters two and three, there is a significant difference in the composition of public spending between more developed and less developed localities, in terms of infrastructure, subsidies and transfers. Surprisingly, current spending has a positive relationship with growth while public capital spending reflects a negative effect. This result is consistent with Devarajan et al. (1996) and Gregoriou and Ghosh (2009). The later finds that current expenditure on wages, salaries, subsidies and pensions in 15 developing countries can be very heterogeneous, and in my perspective, this outcome can be applied to localities in developing countries as well, considering the differentiated results in my work from states and municipalities.

Ghosh and Gregoriou (2008, p.510-512) point out that the traditional logic of spending in capital goods does not work in developing countries not because they have overspent as Devarajan has explained, but as a result of a difference in productivity related to distorted stimulus framework, governmental inefficiencies and corruption. High corruption is associated with high public capital spending and low operational and maintenance disbursement, since capital spending implies new projects that could be compromised to self-interested agents, bribery and fraud, and consequently to a low productivity of public capital expenditure. Likewise, corruption can increase tax evasion, promote a poor tax administration and generate low tax revenues. Therefore, current, operational and maintenance expenditure could enable full capacity utilisation and expand output. There is a

huge task for developing economies to perceive correctly public expenditure productivities of the different types of outlays. According to Bayraktar et al. (2015), the strong link between growth and public expenditure applies to countries with macroeconomic stability, therefore expenditure policy should take into account core sectors in an integrated way, with the interconnection between their current and capital components and specific country characteristics should be addressed to derive any recommendations.

Local governments can provide several types of goods and services directly to the population, invest in physical or social infrastructure, increase productivity of the factors of production or apply transfers/subsidies to specific sectors. Significant expenditure refers to administration, wages and salaries where efficiency of the public sector can promote private investment if public spending is channelled to complimentary goods and services of private production, particularly in developing economies. If public spending is allocated to consumers, income effect can affect labor effort and impact negatively economic activity, however, if it is directed to social and capital infrastructure while improving the marginal productivity of capital, then economic production increases. Social benefit should be higher than its costs and any alternative use of resources; budget planning should focus on the social and production needs of a locality within an adequate institutional framework. Besides, if government spending decreases private enterprise costs, then competitiveness increases and growth. Nonetheless, the relationship between public investment and employment is heterogeneous and there is no clear pattern (Hernández Mota, 2010).

The proper equilibrium between taxes and transfers is essential at a subnational level, thus transparency, efficiency, stability and equity should be properly coordinated as well. Higher local income should promote responsibility in spending, economic development and fiscal discipline. Nevertheless, higher tax collection at a subnational level, increases regional disparities because high income urban localities would be able to handle them but not rural localities,

therefore, central government transfers could compensate this effect and equalise the differences in regional development. In Mexico, where transfers represent more than eighty percent of total income (as it will be analysed in chapters two and three), localities income is not stable and fluctuates according to central government transfers; hence, municipalities can decrease the fiscal effort to collect local revenues, increase spending and debt because mayors perceive transfers as fixed. An increase in central government transfers generates a higher expenditure than the one generated with the same income derived from local taxes because there is a substitution effect where local government maximises its budget.

Blochliger and Charbit (2010) find a negative relationship between transfers and fiscal effort and a positive relationship with spending and debt. Although it would be desirable that transfers were distributed according to the real needs of localities and stabilised local income when fluctuations in the economic cycle occur, their effect is rather destabilising, particularly in localities which receive high transfers and have low fiscal capacity. The increments in transfers from central government are systematic but reductions seem difficult to handle politically. Preferably, it is desirable that municipal public service provision is linked to its costs, therefore, property taxes that are stagnant, not distributive nor cyclic, not exportable and with a uniform tax base should be fully exploited at a local level. Nonetheless, a proper mix of property, consumption and income tax should be evaluated at a local level considering efficiency, equality and stability (Hernández M., 2010).

According to Tello (2015), municipalities with natural resources are highly dependent on the resources derived from them, do not diversify and their effect on employment and manufacturing activities in other sectors is negligible. Although oil and mineral extraction promote other linked activities to flourish, they are all restrained to a single activity but at the moment it ceases, affects the whole economic chain. In fact, income derived from this kind of resources provokes higher inequality, weak institutions, less human capital and investment,

as well as a lack of innovation and effort from municipalities (Alcalde, 2016).

Property tax has been recognised to be the main source of income, particularly for local governments and it could be fully exploited in Latin American countries by improving tax administration, operational capacity, control, expanding coverage and updating cadastral values. Besides, local governments have been the main agents of employment in less developed states, therefore, it has been problematic to restrain current spending. For this reason, it is important that public policy promotes activity of the private sector, as a channel to increase local employment. Diminish bureaucratic barriers to local enterprise creation, foster strategic alliances between the public and the private sector for the provision of public services, promote research and development and enhance entrepreneurship among graduate students. Public programs could focus on strengthening aptitudes of participants conducive to incorporate them to the labor force (ECLAC, 2016).

Public finances develop in this multifaceted context where economics alone is not the sole consideration when evaluating particular decisions regarding fiscal policy: an ethical and political judgement is inherent to this process (Rosen, 2002, p.7). In particular, diverse institutional frameworks in localities play a key role in the efficiency of public policies (North, 1993). By acknowledging the perception of policy makers with respect to income and expenditure variables and their relationship to growth in Mexican states, while understanding local inhabitants' opinions regarding the public services provided, this current work aims to link several fiscal policy outcomes with both sets of actors: local authorities and people affected by the local policies.

In most Latin American countries public finance management, accountability and public policy has been centralised and paternalistic, however, it is necessary to promote better administration, accountability and control at a state and municipal level in order to diminish waste and inefficient use of resources. Thus, the use of resources is limited, while information and data have poor quality and reliability

in the lower levels of government. According to Cabrero Mendoza (2000) around 55 percent of the municipalities in Mexico do not have administrative laws and regulations, and when they do, they are not up to date. Although, the existence of internal rulings does not guarantee an efficient administration, their inexistence generates disorder and impunity. Besides, 74 percent of the localities do not have a proper planning regulation with clear objectives, actions and goals that will allow them an optimum use of resources. Sixty percent of the municipalities do not have a responsible area for expenditure monitoring and planning; and only 46 percent carry out monitoring and supervision activities, mainly in medium and large urban localities. Furthermore, the fact that voters cannot re-elect their legislators, annihilates any possibility to reward or punish them for their performance. The aim of accountability is to make effective the responsibility of the governors to the citizens.

Recent reforms in the secondary legislation in Mexico (July 2016) were enacted to promote a new legal framework which aims to strengthen public governance and endorse accountability, integrity and transparency in the government. In this respect, the National Auditing System is a fundamental platform for the coordination, information and improvement in governance. Committed action among audit institutions, legislature, executive branch and citizens will be necessary to implement reforms and provide positive results to Mexican population. Local audit institutions would have to fulfil their role with accountability and transparency in local governments, promoting evidence-based policies, audits in real time and more frequent reports to legislators for the benefit of local people. In fact, legal, policy and implementation gaps inhibit the efficiency, capacity and quality of auditing at a local level. Hence, the National Auditing System could address these gaps by harmonisation standards and professional improvement of the audit service in states and municipalities. Providing the Congress greater use of the audit reports and enhance their technical capacity would consolidate accountability (OECD, 2017, p.3-4).

Governments promote development usually through four main economic objectives: stabilisation of the economy, allocation of resources, redistribution of income, and economic growth (Tanzi, 2008, p.17). As described earlier in this chapter, local governments raise property, payroll and some indirect taxes but their main source of income are central government transfers, which have a redistributive character since the less developed localities receive a higher amount of transfers. Subsidies play an important role in low income localities because they are a mean to overcome regional disparities. Nonetheless, local governments have to be cautious of subsidy design, purpose and framework in order to keep sound local public finances. Furthermore, according to the results of this work, current government spending is preferable to public capital in less developed localities because operational and maintenance expenditure can enable full capacity and enhance growth. In this context, the difference in productivities, government inefficiencies and corruption play an important role. Therefore, local governments can prioritise investment to complimentary goods and supplies that promote growth and an appropriate provision of public services. In order to stabilise local economies, an effort has to be made to strengthen local income so as not to be so dependent in central government transfers, update cadastral values, apply new technologies, achieve fiscal discipline and better accountability and transparency in the spending.

In Latin America, various actors are involved in the budgetary process: ministers, legislators, civil servants and civil society, since it is one of the most important matters for a nation. Nonetheless, priorities and procedures vary between countries (Filc and Scartascini, 2010, p.2). In Mexico, the ministers of finance do not design the government budget in isolation because public finances are circumscribed by a legal framework as follows. The President, through the Ministry of Finance, presents to the Chamber of Deputies the economic package. This package contains the General Criteria of Economic Policy, the initiatives for the Federal Revenue Law, several initiatives of amendments to income tax, federal fees, federal tax and excise tax and the Federal Spending Budget project. Subsequently, the Chamber of Deputies makes amendments to the original project and when it is ready, it is revised, modified and approved by the Senate.

At a local level, governors are obliged to present their income and spending budget projects, as well as the amendments to their tax codes and local fees to the Local Congress, which then makes further amendments until approval is reached (SHCP; 2012).

Local governments are the closest providers of most public services to the community and they are required to align their objectives to the National Development Plan (Presidencia de la República, 2007). National policies should be demarcated by acknowledging the distinct capabilities and resources found at the different layers of government. For instance, more developed localities can have some space for fiscal policy management while less developed localities, which might be highly dependent on central transfers, can scarcely have any opportunities for fiscal policy management. According to this thesis, one of the main concerns of public finance government officials and other governmental bodies (Ministries of Finance, Congress, etc.) is how to increase revenue and optimize the use of resources (expenditure), which in turn can lead to higher levels of GDP per capita growth, investment and employment, in other words, better fiscal policy management and economic performance. The idea of effectiveness in the use of resources while analysing disaggregated revenue and expenditure trends at a national level has been developed by Gemmell and Au (2013, p.223-229) and Kneller et al. (1999, p.171-190).

At the local level, which is the main focus of this study, I must consider that social, economic, political, administrative and institutional variables as well as powerful groups of interest, the level of development and degree of accountability pertaining to each locality play an important role in establishing the ways in which resources are distributed and applied. Unfortunately, local finances in Mexico, particularly at a municipal level, are opaque with regards to administration and distribution of resources (IMCO, 2014). As mentioned earlier, local governments most of the time have limited resources and capabilities, high dependency on central government transfers, diverse forms of local public service provision, different legislation, as well as different levels of

poverty, inequality, accompanied with fragile institutions, a lack of transparency and weak accountability. Diversity and heterogeneity among localities give birth not only to an uneven distribution of wealth but also to distinct local public service delivery (Moscovich, 2015). Therefore, in order to be able to provide public services efficiently, specific administrative, social, economic and institutional framework should be taken into account when data are available. Latin American localities in particular, present high levels of inequalities in terms of resources, capabilities, responsibilities and fiscal policy management, therefore, a uniform central policy that fails to acknowledge their differences would show different effects of fiscal policy on local economic growth.

Fiscal policy can be considered a governmental mechanism which allows for the management of income and expenditure variables to achieve specific governmental economic and social objectives (Bunea-Bontas *et al.*, 2009 p.2). Fiscal policy delineated at a central level can stimulate economic activity by adjusting the fiscal tax scheme and government trends in expenditure and debt. As discussed before, decisions concerning taxing different sources of income from households and/or businesses, consumption or property depend upon efficiency and distributional considerations, while enhancing the use of infrastructure and capital expenditure is important to stimulate a better provision of public services. Nonetheless, the pressure of pension disbursements and resources committed to education, health, social welfare or insurance programmes, usually limits the room for governmental manoeuvring. Furthermore, at a local level, the possibility of fiscal policy management depends heavily on the role of central government transfers in supporting local public finances and frameworks. Consequently, government finance has a direct impact on the way people in localities develop their work, consume, pay taxes, invest or save in certain assets or activities. Individuals' willingness to contribute to public funds can be determined by their satisfaction with public services, the transparency and accountability of public resources, their perceptions with respect to whether or not the money they pay through taxes, fees and charges is being invested satisfactorily so as to their needs.

## *Aims and objectives*

The first aim of this work is to understand the effect of fiscal variables on output per capita growth and employment/unemployment in 32 states and 2,247 municipalities of Mexico, and in 20 Latin American economies from 1994-2010. Particularly, by using a full disaggregation of fiscal components, I will be able to analyse the impact of fiscal policy in different levels of government and development. The second aim is to evaluate the impact on GDP per capita of the 1998 Federal Reform to the Fiscal Coordination System in Mexico, because it was the most significant reform for a decade regarding transfers from central to local governments. Finally, to complement the overall analysis, the third aim is to make a link between the perception of policy makers regarding fiscal policy variables, public finances and the opinions of people regarding taxes levied and spending efficiency.

Specifically, the questions considering the distinct levels of government are:

1) What is the combined impact of taxes and public expenditure on output per capita growth and employment?

2) What is the impact on GDP per capita of the 1998 Federal Reform to the Fiscal Coordination System in Mexico?

3) What is the linkage between the perception of policy makers with respect to fiscal variables, public finances and the local inhabitants' opinion regarding public services provided?

This thesis addresses the first and second questions using fixed-effects panel data econometric methodology of local fiscal variables and the third question is addressed with the analysis of a self-developed survey covering the 32 Mexican states and Latinobarómetro surveys for the period from 2008 to 2010.

## *Main research methods*

This study will contribute to a better understanding of different tax and expenditure combinations and their effect on output per capita growth and

employment, using a fixed-effects panel data econometric approach to Mexico's 32 states and 2,247 municipalities and 20 Latin American countries from 1994 to 2010 by applying fixed-effects regression with Driscoll-Kraay standard errors to states and municipalities in Mexico. Additionally, simultaneous quantile regressions in Mexican municipalities are analysed in order to understand the diversity among localities. The econometric model utilised is derived from Gemmell, Kneller & Sanz (2012 p.1-35) and Kneller, Bleaney & Gemmell's (1999, p.171-190) approaches considering GDP per capita growth in terms of a set of fiscal and control variables. Additionally, I analyse the impact of taxes and central government transfers on employment at a country, state and municipal level.

## *Contribution to Knowledge*

The main contribution of this study is to estimate -within the limitations of the available data- the impact of the main income and expenditure components on GDP per capita growth and employment at a sub-national level in Mexico and in the 20 Latin American countries between 1994 and 2010, acknowledging their distinct framework of level of government and development of each. Accordingly, the innovative contribution of this study is to analyse the combined effects of different kinds of disaggregated expenditure and taxes on output per capita and employment at a sub-national level and acknowledging their differences. For the case of Mexico in particular, the impact on output per capita of the 1998 Federal Reform to the Fiscal Coordination System is analysed. The linkage between policy makers' perception regarding fiscal variables, public finances and the local inhabitants' opinion in relation to public services provided is crucial to understanding the way resources are utilised according to the priorities of the local authorities and the perceived benefit of governmental services among people within a certain locality. This in turn gives a broader picture of the use of public funds by involving both actors: local authorities and the people affected by the local policies.

## *Structure of the study*

This study is organised as follows:

### 1. Introduction

This chapter explains the importance of fiscal policy management for achieving specific economic and social objectives in Latin American economies and in Mexico in particular. The purpose and the main contribution of the current study are the combined analysis of disaggregated income and expenditure key components and their effect on GDP per capita growth and employment at a sub-national level whilst taking into consideration their differences, have been presented.

### 2. Mexico: State Performance and Analysis

The first section of this chapter refers to the development of fiscal policy measures in the Mexican tax system and the evolution of public expenses in the last 30 years. Issues of fiscal federalism are raised in order to understand intergovernmental relationships in the country. The second section indicates the evolution of macroeconomic growth theory with particular focus on the endogenous growth models. It also describes the inclusion of government employment in a macroeconomic model and explains the approach of Gemmell (2012) and Kneller (1999) within the framework of Government Budget Constraint Models. Previous empirical research on the topic is exemplified. The third section provides a general description of the main methodologies utilised in growth and employment models. Finally, in the last section, a fixed effect panel data approach considering cross sectional dependence is applied to the 32 states with the aim of determining the combined effect of fiscal policy variables on GDP per capita growth and employment. The impact on GDP per capita of the 1998 Federal Reform to the Fiscal Coordination System is examined.

## 3. Mexico: Municipal Fiscal Analysis

Municipal heterogeneity has been a concern for public policy analysis, and it is necessary to understand their specific dynamics, capabilities, possibilities and sources of improvement in order to develop sound municipal finances. The relevant literature and methodologies at a local level are addressed. A fixed effect panel data approach considering cross sectional dependence is applied to the 2,274 municipalities with the aim of determining the combined effect of fiscal policy variables on growth and employment. Quantile regressions are later considered in order to understand the growth and employment disparities among different localities.

## 4. Latin America

This chapter refers to the development of fiscal policy measures in 20 Latin American countries during the period covering 1994 to 2010. The relevance of intergovernmental transfers, quality and transparency of public expenditure are discussed. Some literature review and methodologies utilised are described. A cross-country panel data approach is applied at a national level for two levels of government with the purpose of outlining different income and expenditure trends and their impact on growth and unemployment.

## 5. A Social Perspective of Public Finances

The first section of the chapter refers to the challenges and limitations of surveys of public opinion, while the second describes some survey methodologies. The third section relates to the Mexican framework, considering the perception of policy makers regarding different kinds of taxes levied and several types of expenditure utilised and their impact on output per capita. The last part of the chapter refers to local inhabitants' opinion regarding public services provided considering the regional surveys provided by Latinobarómetro 2008, 2009 and 2010.

# 6. Concluding Remarks, Recommendations and Future Research.

The first part of this chapter gives an overall view of this study. In the second part, the major findings and implications of the empirical research are briefly described. Finally, the recommendations, limitations and potential areas of future research are recognised.

# 2. Mexico: State Performance and Analysis

This chapter refers to the development of fiscal policy measures in the Mexican tax system and the evolution of public expenses over the period from 1980 to 2010. Issues of fiscal federalism are raised in order to understand intergovernmental relationships in the country. The second section refers to the evolution of growth and employment theories and explains the approach of Gemmell (2012) and Kneller (1999) within the framework of Government Budget Constraint Models. Previous empirical research on the topic is exemplified. The third section describes the main methodologies utilised in growth and employment models. Finally, in the last section, a fixed effect panel data approach considering cross sectional dependence is applied to the 32 states with the aim of determining the simultaneous effect of fiscal policy variables on growth. Besides, the impact of taxes and central government transfers on employment will be evaluated. The impact on GDP per capita of 1998 Federal Reform to the Fiscal Coordination System is examined.

## *2.1 Evolution of the Mexican Economy*

### 2.1.1 Mexican Income Policy

At the beginning of the 1980's there was a comprehensive revision of the Mexican tax system, modernising income and indirect taxation and at the same time, realise a complete transformation of the fiscal coordination system (Budebo, 1995). The multiple schedular taxes imposed on personal income tax were substituted by the concept of global income applying unique progressive tax rates. At a corporate level, the double taxation on dividends was eliminated through the inclusion of a special account which levied taxes only at a corporate level; however, if some earnings were not taxed, these would be recognised and taxed at an individual level. Regarding indirect taxation, tax on mercantile revenues, one hundred state taxes and thirty-one federal taxes where substituted by the value added tax, the special tax on production and services and the tax on new cars. Moreover, by the end of the decade, a complete indexation of assets, liabilities and capital was fully recognised in the fiscal system and a minimum tax was introduced in order to increase the efficiency and control of the tax system (Amieva-Huerta, 2002).

A significant reform during 1980 was the establishment of a fiscal coordination system which enabled the federal government to keep the most important taxes such as income and value added, while giving the states the faculty to have a share in their revenue and administration. Between 1980-1985 there was a constant reduction of value added tax receipts and although the states kept thirty per cent for each peso collected, federal government decided to transfer the total administration of the value added tax to the states in 1990 (Budebo *et al.*, 1995). However, in 1990 the federal government reassumes the administration of this tax attending efficiency considerations. In 1989 an asset tax of 2% was introduced as means of improving efficiency and control of the tax system. The introduction of this tax increased the tax base and revenue while diminishing fiscal evasion. Budebo *et al.*, 1995 highlight that for each peso collected through the asset tax, an additional 3.5 pesos were collected by the income tax.

According to 1983 General Public Finance Account, governmental income can be classified in: 1) taxable and non-taxable; 2) oil and not oil income; 3) proceeds derived from federal government and parastatal sector under direct budgetary control. During the period 1983-1989 there was a considerable reduction in the oil proceeds due to the decline in prices, therefore, there was a lot of pressure on the government budget considering that that oil income accounted for 38% of the total income (Amieva-Huerta, 2010). Under these circumstances, the only source of income that could be more reliable and long-lasting is taxable income which depends upon the taxing scheme and economic activity. In the present thesis, I consider the first classification of income in each of the 31 states and the Federal District (32 local entities in total) distinguishing between taxable and non-taxable income.

During the 1990s, one of the most significant steps in achieving higher efficiency in tax collection was the introduction of the tax administration service in 1997 with the purpose of strengthening tax receipts, realise an effective application of the tax legislation, promote voluntary compliance and improve service with the development of the professional fiscal career (Budebo 1999).

In this century, fiscal policy in Mexico has played a fundamental role in order to attain macroeconomic stability while encouraging moderate spending. The main orientation of the fiscal reforms has been the development of an efficient and internationally competitive tax code. In this context, the current analysis and exclusively for the **Mexican States and the Federal District, Income from Local Entities** will be disaggregated as:

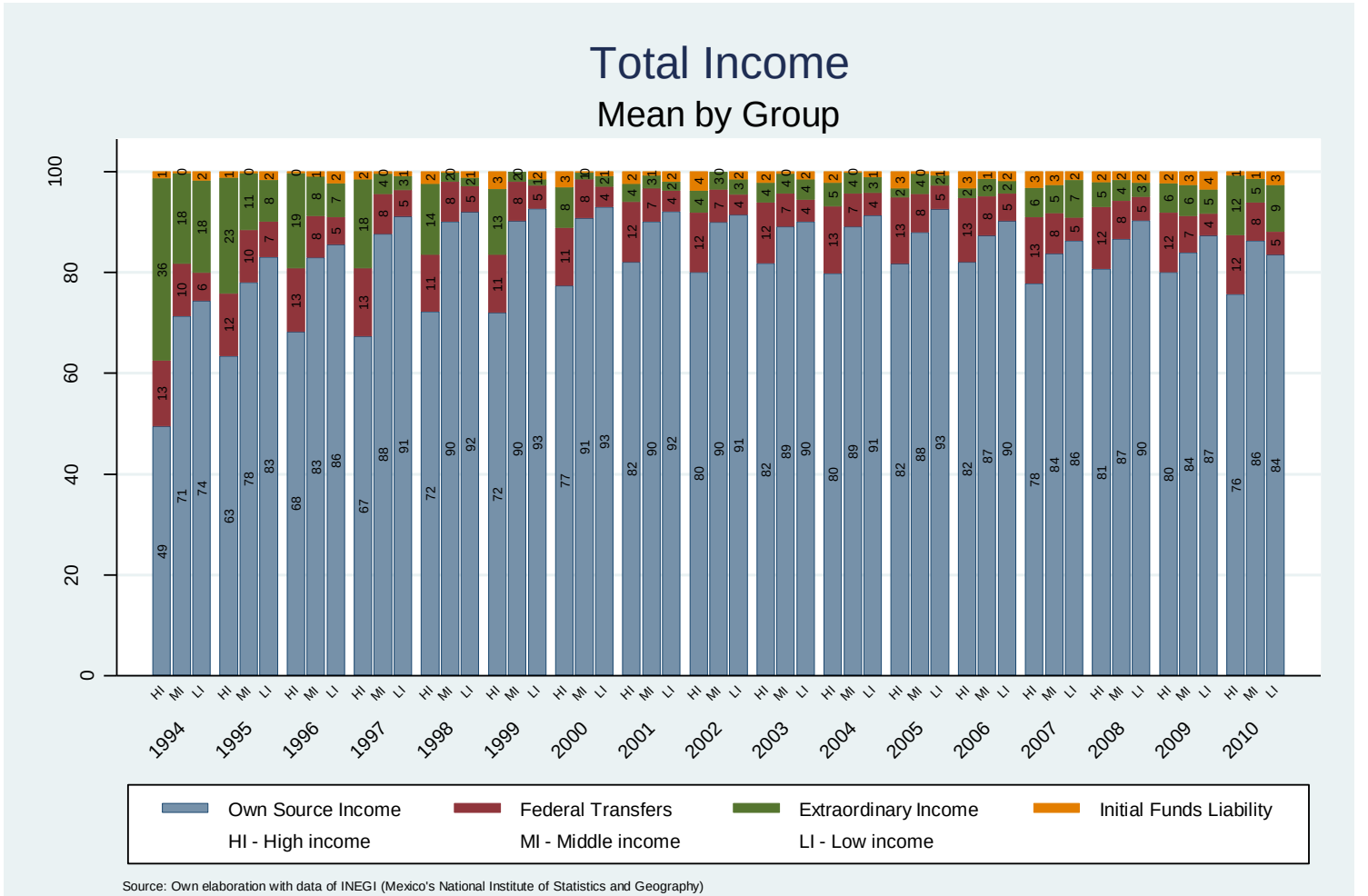
- **Taxes (own source)**
- Rights (own source)
- Financial Products (own source)
- Other Duties (own source)
- Improvement Contributions (own source)
- **Income Federal participation (non-earmarked transfers)**
- **Federal Government Contributions (earmarked transfers)**
- Other Income

## *Income Trend Development*

As it has been addressed, states are highly dependent on federal income resources, high income states receive between 49 and 82 percent of their total income from federal transfers, while generating between 11 and 13 percent of their own resources. Distrito Federal would be the only exception to the rule, since it generates around 42 percent of its resources. In the case of middle income localities, they receive between 71 and 91 percent of federal resources, while they generate about 7 and 10 percent of their own resources. Lower income states present the highest dependency on federal transfers with a rate between 74 and 93 percent, while own source income represent around 4 or 7 percent.

In relation to resources derived from local taxes, high income states receive above 4 percent of their income from this source, except Distrito Federal which receive around 20 percent of its income from taxes. Middle income states receive between 2 and 4 percent from taxes, while low income localities receive between 1 and 2 percent from this source.

**Graph 2.1 State Income by Group 1994-2010**




Source: Own elaboration with data of INEGI (Mexico's National Institute of Statistics and Geography)

## Table 2.1 State Income by Group 1994-2010

| Group | Variable | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **High income** | Federal Transfers | 49.44 | 63.40 | 68.21 | 67.30 | 72.26 | 72.00 | 77.38 | 82.05 | 80.09 | 81.78 | 79.82 | 81.74 | 82.01 | 77.81 | 80.74 | 80.00 | 75.68 |
| | Own Source Income | 13.02 | 12.43 | 12.59 | 13.49 | 11.20 | 11.45 | 11.48 | 11.98 | 11.75 | 12.05 | 13.31 | 13.12 | 12.78 | 13.20 | 12.22 | 11.87 | 11.76 |
| | Extraordinary Income | 36.22 | 22.95 | 18.86 | 17.67 | 14.08 | 13.16 | 7.98 | 3.55 | 4.39 | 3.92 | 4.69 | 1.75 | 1.89 | 5.82 | 4.93 | 5.83 | 11.76 |
| | Initial Funds Liability | 1.31 | 1.22 | 0.34 | 1.55 | 2.47 | 3.39 | 3.16 | 2.41 | 3.78 | 2.25 | 2.19 | 3.38 | 3.32 | 3.17 | 2.11 | 2.29 | 0.80 |
| **Middle income** | Federal Transfers | 71.31 | 78.06 | 82.91 | 87.67 | 90.12 | 90.16 | 90.71 | 90.08 | 89.94 | 89.09 | 89.06 | 87.98 | 87.34 | 83.68 | 86.60 | 83.89 | 86.27 |
| | Own Source Income | 10.42 | 10.31 | 8.29 | 7.87 | 7.86 | 7.80 | 7.74 | 6.55 | 6.52 | 6.55 | 6.58 | 7.53 | 7.75 | 8.12 | 7.65 | 7.26 | 7.56 |
| | Extraordinary Income | 17.99 | 11.36 | 7.80 | 3.98 | 1.85 | 1.89 | 1.38 | 2.62 | 3.44 | 3.99 | 4.17 | 4.09 | 3.46 | 5.49 | 4.05 | 6.14 | 4.73 |
| | Initial Funds Liability | 0.28 | 0.27 | 1.00 | 0.48 | 0.17 | 0.14 | 0.17 | 0.75 | 0.10 | 0.38 | 0.19 | 0.39 | 1.45 | 2.71 | 1.70 | 2.71 | 1.45 |
| **Low income** | Federal Transfers | 74.40 | 83.04 | 85.52 | 91.08 | 91.98 | 92.66 | 92.97 | 92.13 | 91.46 | 90.04 | 91.35 | 92.52 | 90.14 | 86.28 | 90.26 | 87.31 | 83.52 |
| | Own Source Income | 5.57 | 7.04 | 5.44 | 5.21 | 5.08 | 4.61 | 4.02 | 4.07 | 4.01 | 4.37 | 4.47 | 4.70 | 5.49 | 4.62 | 4.75 | 4.31 | 4.54 |
| | Extraordinary Income | 18.21 | 8.22 | 6.69 | 2.88 | 1.78 | 1.16 | 2.18 | 1.85 | 3.03 | 4.07 | 3.08 | 2.05 | 2.49 | 7.43 | 2.76 | 4.82 | 9.33 |
| | Initial Funds Liability | 1.82 | 1.69 | 2.35 | 0.83 | 1.16 | 1.57 | 0.83 | 1.95 | 1.50 | 1.51 | 1.10 | 0.73 | 1.89 | 1.67 | 2.23 | 3.55 | 2.61 |

With respect to other income derived from goods and services provided, resources received represent roughly half percent of the income for all groups, except of Distrito Federal who receives around 2 percent of its income from this source.

When analysing the evolution of own source income in high income localities, taxes represent only a small amount of resources, however within this category, direct taxes represent around 80%, while indirect and other taxes represent 20%. In case of middle income states, taxes represent around 70% of this category, while the other categories represent around 30%. In low income localities, direct taxes account for 90% of taxable income and the rest is distributed between indirect and other taxes.

As mentioned earlier, federal transfers account for an average of 80 percent of the total income for high income states. Distrito Federal would be the only exception to the rule, since it generates around 42 percent of its resources. Of those resources, around 55 percent represent non-earmarked transfers and 45 percent represent earmarked transfers. In the case of middle income localities, they receive around half of their federal resources from non-earmarked transfers and the other half of earmarked transfers. Lower income states present the highest dependency on federal transfers with an average rate of 86 percent, where non-earmarked transfers account for 42 percent and earmarked transfers for 58 percent.

### 2.1.2 Expenditure Economic Policy

According to Amieva-Huerta (2010 p.252-256) current public spending is positively related to GDP per capita, which means that current public spending is not counter-cyclical and it is highly inelastic due to the institutional committed expenditures of the public sector. Moreover, his analysis rejects Barro's neutrality hypothesis where fiscal policy affects private savings. His findings demonstrate that public current savings have a positive effect on private savings which means an interesting result: "public investment complements private investment".

During the 1980's there were high levels of public expenditures which generated in turn high fiscal deficits and caused severe economic crises in 1976, 1982 and 1986-1987. While in the last two decades there was a prudent management of governmental expenses which enabled stability and economic growth. The fiscal discipline conducted did not meant balanced budget since moderate deficits which do not cause major economic disturbances are desirable, when the additional resources are invested in productive projects. Between 1991 and 2008, fiscal policy was orientated to sound public finances with economic deficits not above 0.6% of GDP Amieva-Huerta (2010, p.172).

In Mexico, the Public Sector includes the Federal Government and the Parastatal Sector. In order to derive the economic balance, the Non-Financial Public Sector is utilised. The expenditure policy according to its economic objectives has a fundamental role in terms of social security, health, education and investment. However, the role of the Parastatal sector is also important in areas such as: energy, communications and transport. Programmable Spending can be classified in three ways: Administrative (according to where the resources are allocated - who spends the resources); Economic (which determines the destiny of resources - in what are the funds spent) and Functional (refers to the purpose of spending – what is the objective of the disbursements).

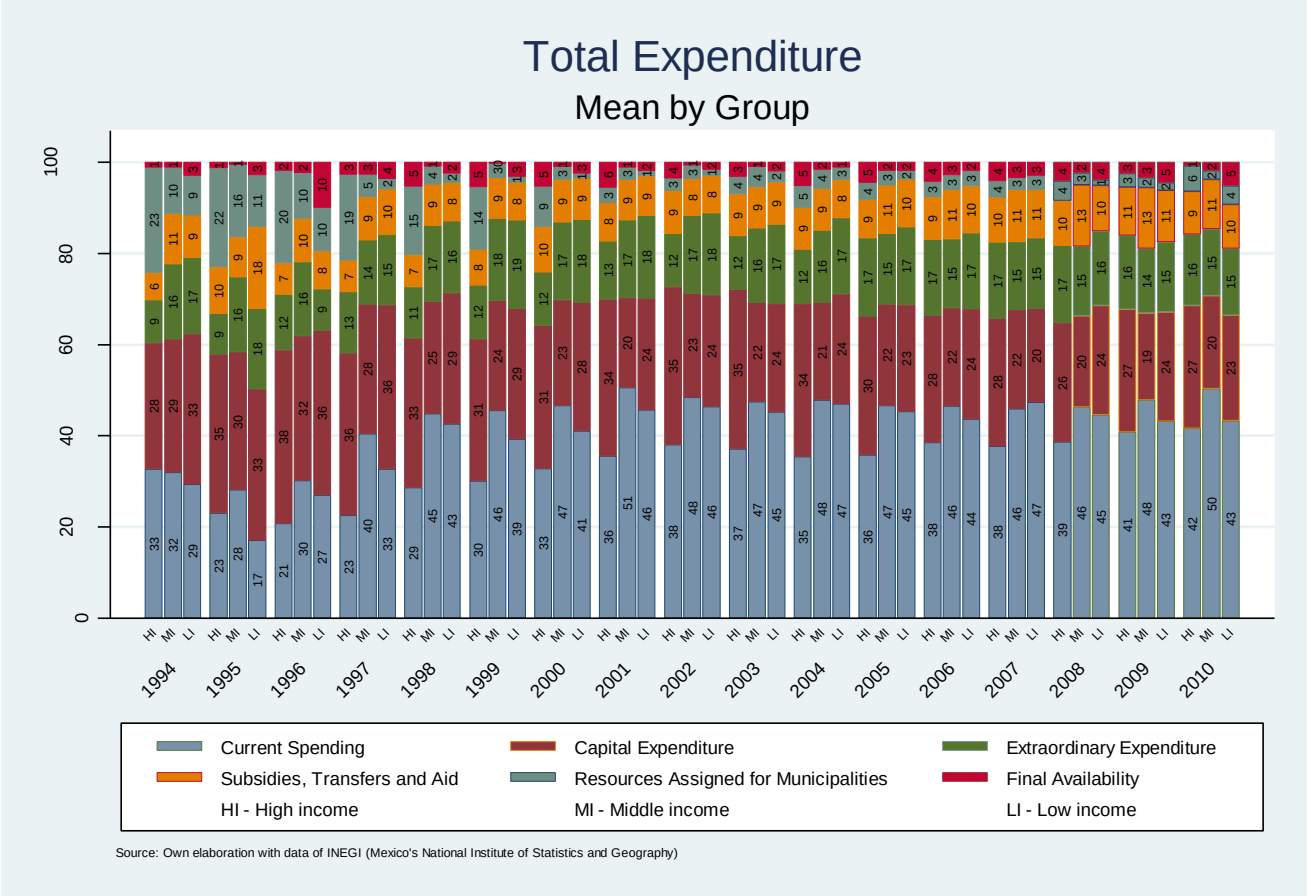
Regarding the Expenditure classification of States in Mexico, the publication of the Government Accounting Law was made the 31st of December of 2008 in the Federal Official Register, while the Functional Classification of Spending that applied to all government entities, states and municipalities regarding federal funds was published until the 10th of June of 2010. Therefore, the economic classification is used in order to analyse the trends of disaggregated expenses. In this context, the current analysis and exclusively for the **Mexican States and Mexico City Spending from Local Entities** will be disaggregated as:

- Personal services
- Materials and inputs
- General services
- **Subsidies, transfers and aid**
- **Acquisition of mobiliary and estates**
- **Public building and social actions**
- Financial investment
- Resources assigned to municipalities
- Other spending

## *Expenditure Trend Development*

The development of total spending clearly shows that about 32 percent of total spending for high income localities is current expenditure, subsidies, transfers and aid are about 31 percent and capital expenditure accounts for 8 percent. Resources assigned for municipalities represent 13 percent of total expenditure and extraordinary expenditure accounts for 12 percent of total spending. In the case of middle income states about 25 percent of total spending refers to current expenditure, subsidies, transfers and aid are about 39 percent and capital expenditure accounts for 11 percent. Resources assigned for municipalities represent 16 percent of total expenditure and extraordinary expenditure accounts for 9 percent of total spending. In low income localities, current spending represents 28 percent of total expenditure, subsidies, transfers and aid account for 32 percent while capital expenditure represents 13 percent of total disbursements. Resources assigned for municipalities represent 14 percent of total expenditure and extraordinary expenditure accounts for 6 percent of total spending.

**Graph 2.2 State Expenditure by Group 1994-2010**




Source: Own elaboration with data of INEGI (Mexico's National Institute of Statistics and Geography)

## Table 2.2 State Expenditure by Group 1994-2010

| Group | Variable | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| High income | Subsidies, Transfers and Aid | 32.64 | 22.94 | 20.70 | 22.53 | 28.63 | 30.07 | 32.77 | 35.55 | 37.96 | 37.08 | 35.43 | 35.78 | 38.47 | 37.68 | 38.56 | 40.81 | 41.53 |
| | Current Spending | 27.63 | 34.81 | 38.05 | 35.53 | 32.71 | 31.09 | 31.41 | 34.35 | 34.61 | 34.88 | 33.50 | 30.34 | 27.81 | 27.97 | 26.15 | 26.90 | 27.02 |
| | Resources Assigned for Municipalities | 9.46 | 9.00 | 12.17 | 13.49 | 11.21 | 11.85 | 11.61 | 12.72 | 11.68 | 11.81 | 11.91 | 17.14 | 16.64 | 16.72 | 16.90 | 16.19 | 15.59 |
| | Capital Expediture | 5.95 | 10.20 | 6.89 | 6.83 | 7.04 | 7.86 | 10.01 | 8.49 | 9.50 | 9.20 | 9.16 | 8.53 | 9.42 | 9.88 | 9.91 | 10.62 | 9.40 |
| | Extraordinary Expenditure | 23.15 | 21.73 | 20.27 | 18.95 | 15.11 | 13.65 | 8.83 | 3.32 | 2.70 | 3.83 | 4.75 | 3.66 | 3.41 | 3.57 | 4.37 | 2.95 | 5.64 |
| | Final Availability | 1.18 | 1.31 | 1.91 | 2.68 | 5.31 | 5.48 | 5.35 | 5.56 | 3.56 | 3.21 | 5.25 | 4.55 | 4.25 | 4.17 | 4.10 | 2.53 | 0.83 |
| Middle income | Subsidies, Transfers and Aid | 31.92 | 28.07 | 30.12 | 40.39 | 44.83 | 45.52 | 46.61 | 50.59 | 48.37 | 47.41 | 47.80 | 46.54 | 46.45 | 45.82 | 46.24 | 47.83 | 50.29 |
| | Current Spending | 29.22 | 30.22 | 31.76 | 28.40 | 24.51 | 24.13 | 23.08 | 19.60 | 22.84 | 21.72 | 21.32 | 22.27 | 21.51 | 21.74 | 20.05 | 19.05 | 20.38 |
| | Resources Assigned for Municipalities | 16.47 | 16.46 | 16.18 | 14.06 | 16.72 | 18.01 | 17.13 | 17.06 | 17.05 | 16.34 | 15.89 | 15.49 | 15.14 | 14.96 | 15.23 | 14.21 | 14.67 |
| | Capital Expediture | 11.08 | 8.84 | 9.55 | 9.48 | 9.12 | 8.84 | 9.25 | 8.87 | 8.09 | 9.06 | 9.13 | 10.54 | 10.83 | 11.45 | 13.48 | 13.32 | 10.81 |
| | Extraordinary Expenditure | 10.15 | 15.88 | 10.01 | 5.00 | 3.84 | 3.12 | 2.82 | 2.72 | 2.91 | 4.37 | 4.25 | 3.31 | 3.20 | 2.62 | 2.64 | 2.12 | 1.98 |
| | Final Availability | 1.15 | 0.52 | 2.37 | 2.67 | 0.99 | 0.37 | 1.10 | 1.17 | 0.75 | 1.10 | 1.61 | 1.84 | 2.88 | 3.40 | 2.35 | 3.47 | 1.88 |
| Low income | Subsidies, Transfers and Aid | 29.33 | 16.97 | 26.93 | 32.65 | 42.58 | 39.25 | 40.97 | 45.62 | 46.33 | 45.16 | 46.95 | 45.31 | 43.64 | 47.37 | 44.54 | 43.09 | 43.25 |
| | Current Spending | 32.88 | 33.15 | 36.12 | 36.04 | 28.73 | 28.53 | 28.18 | 24.45 | 24.43 | 23.72 | 24.08 | 23.34 | 24.01 | 20.46 | 24.03 | 24.02 | 23.11 |
| | Resources Assigned for Municipalities | 16.81 | 17.75 | 9.08 | 15.33 | 15.76 | 19.44 | 18.27 | 18.13 | 18.07 | 17.44 | 16.66 | 17.10 | 16.79 | 15.43 | 16.33 | 15.43 | 14.74 |
| | Capital Expediture | 9.32 | 18.00 | 8.27 | 10.05 | 8.46 | 8.21 | 9.07 | 8.68 | 8.24 | 9.30 | 8.33 | 10.40 | 10.30 | 10.70 | 9.99 | 11.30 | 9.55 |
| | Extraordinary Expenditure | 8.69 | 11.30 | 9.55 | 2.23 | 2.01 | 1.34 | 0.98 | 1.21 | 1.27 | 2.37 | 2.82 | 1.94 | 3.36 | 3.07 | 1.20 | 1.59 | 4.13 |
| | Final Availability | 2.97 | 2.83 | 10.04 | 3.70 | 2.45 | 3.23 | 2.53 | 1.91 | 1.67 | 2.00 | 1.15 | 1.90 | 1.90 | 2.97 | 3.92 | 4.57 | 5.21 |

With respect to the evolution of current expenditure in high income localities, personal services account for 80 percent, general services represent about 14 percent while materials and inputs comprise 6 percent of total current spending. Regarding middle income states, personal services account for 82 percent, general services represent about 14 percent while materials and inputs involve 4 percent of total current spending. In the case of low income localities, personal services represent 85 percent, general services justify about 10 percent while materials and inputs occupy 5 percent of total current spending.

The development of capital expenditure in high income localities reflect 95 percent of resources applied to public building and social actions, while acquisition of mobiliary and estates and financial investment add up to the other 5 percent of capital expenditure. With respect to middle income states the resources applied to public building and social actions represent on average 90 percent of capital expenditure, while acquisition of mobiliary and estates and financial investment add up to the other 10 percent. Concerning low income localities, the resources applied to public building and social actions represent on average 95 percent of capital expenditure, while acquisition of mobiliary and estates and financial investment make the other 5 percent of capital expenditure.

### 2.1.3 Fiscal Federalism

Mexico is the fifth largest country in the American Continent (2 million $m^2$) and according to the latest Census (Censo de Población y Vivienda 2010) it has a population of over 112 million. Mexico is a federation with thirty-one states and the Federal District (Mexico City) and 2,247 municipalities. Each State has a Local Constitution and Congress, which enables each locality to manage autonomously their own-source income and expenses.

**Figure 2.1 Mexican States and the Federal District**


Source: Modified version of Map from Colmenares Paramo (2007).

The Mexican Fiscal Coordination System has its origins in three National Conventions (1925, 1933 and 1947) in order to define new administration and distribution of tax faculties, eliminate multiple taxation and promote a better distribution of resources. The normative base of 1980's Mexican Fiscal Coordination System is in the Fiscal Coordination Law and the Accession Convention. It has an Income Participation System where all Current Fiscal Federal Income conform the Federal Participable Revenue. All the Local Entities have a share of the Federal Participable Revenue by means of multiple funds and consensual formulas. The strength of the System depends upon the Permanent Commission of Fiscal Servants, Technical &Working Groups and the Governors National Conventions which operate by consensus. The formulas of income distribution among States have been thoroughly revised and changed (Páramo, 2007).

According to Ahumada (2010), at the beginning of the 1980's there were three funds which basically distributed the proceeds under a compensatory principle by incentivising states which showed higher collections of taxes, however, this situation generated an inertial component which beneficiated the most wealthy and oil-producer states. During the nineties, the formula of distribution was modified by considering 3 components: Compensatory (45.17%), Distributive (45.17%) and the inverse per capita of the other two (9.66%). Additionally, in 1998 the 33rd general branch provisions "earmarked transfers" is created as means of federal contributions to states which are conditional to the promotion of specific areas such as: Basic and teacher's education; Health services; State social infrastructure; Technologic and senior education; Public security, among others. In 2008, with the Reform, the Income participation distribution (non-earmarked transfers) was made according the GDP of the local entities (60%), the collection effort from the local entity of property tax and water rights considering the mobile average during the last 3 years (30%) and each entity local revenue weight with respect to national (10%). Besides, the earmarked transfers reform of Branch 33 had the aim of clarifying its compensatory purpose, therefore, the fund devoted to strengthening the states is distributed according to the inverse proportion of state GDP per capita and the fund for basic and teacher's education incorporated on its distribution criteria taking into consideration educational lagging and quality.

In the Mexican Federal System, the responsibilities of income and expenses are distributed in relation with the most suitable approaches regarding decision making process of the provision of public goods and services. Therefore, in order to attain economies of scale, the local jurisdiction closer to the population where the service is provided should be the most efficient supplier. However, the Central Government has a competitive advantage of collecting proceeds, such as income and consumption taxes, which have the most income potential in an economy. Moreover, the Central Government has a national vision of growth and promotes a uniform development among States where there are severe regional disparities (state and municipal) in terms of income, capacity and

economic performance. For further detail see Table 2.3 Tax Assignment in a Federation and Table 2.4 Local Taxes Levied by States 2010

## *1998 Federal Reform to the Fiscal Coordination System in Mexico*

The legal figure of "federal contributions to federal entities and municipalities" was created in 1998 considering seven funds to transfer the resources associated with basic education, to health services to the open population, social infrastructure, technology education and to adults and public security. In all cases, the transfer of resources was designed in such a way as to make them with formulas auditable and transparent.

One of the fundamental purposes of the federalization process in Mexico has been to give power and resources to each level of government, since they are in a better position to provide public goods and services needed by the population, considering local contexts. For instance, the Federal Government can share responsibilities in the development of infrastructure (trunk roads) and public health with States. In turn, it can coordinate with the state governments to provide services of preventive and curative medical care and local infrastructure (state highways), and even delegate completely the improvement and maintenance of basic infrastructure to state, and municipalities (Amieva Huerta, 2002).

The federalization of public spending in Mexico has been carried out by means of the federal holdings to states and municipalities, and through two main aspects: Federal contributions to federal entities and municipalities, Bouquet 033, and Decentralization conventions in the field of secondary and higher education, agricultural development and partially, communications and transport.

The federal contributions to federal entities and municipalities were incorporated in the budget of expenditures of the federation of 1998, in Bouquet 033. This includes the following funds:

A. Fund of contributions for basic education and Normal (FAEB)
B. Fund contributions for health services (FASSA)
C. Fund of contributions for the Social Infrastructure (FAIS)
    a) Fund for State Social Infrastructure (FISE)
    b) Municipal Social Infrastructure Fund (FISM)
D. Fund of contributions to the strengthening of municipalities (FORTAMUN)
E. Multiple contributions fund (FAM)
    a) Social Assistance
    b) Educational Infrastructure
F. Contributions to the fund and Technological Education of Adults (FAETA)
    a) Technology education
    b) Education for Adults
G. Fund of contributions for Public Security of the States and the Federal District (FASP)

The Bouquet 033, has the following characteristics: it embraces all the federal entities; is based on a legal framework that determines the amounts and their distribution; the destination of budget allocations and their accessories, is expressly established the legal framework; and the resources of each fund contributions may not be seized, or used as a guarantee of payment of any type of credit. The control and monitoring of the resources of the bouquet 033, once they are received by the federal entities and municipalities, and until its total outlay, corresponds to the control authorities and internal oversight of the government level that corresponds. The audit of the public accounts of the federal entities and municipalities, is carried out by the local congresses, in accordance with its own laws, ensuring that the units of the local executive and municipalities, respectively, have applied the resources of the funds for the purposes that are provided for in the law (LCF, 2000).

## Table 2.3 Tax assignment in a federation

| Tax Type | Government Level | Justification |
|---|---|---|
| Personal income tax | Central and State Government | Government must play a dominant role as the main social agent concerned in promoting income redistribution, even though some states can also perform it |
| Corporate tax | Central Government | At the central level, administration and accomplishment problems related to these taxpayers are less than at a state level |
| Payroll tax | Central and State Government | Can be imposed by both government levels and be tagged for financing social security systems or public works for the local government |
| Wealth tax | Central government | At the central level, due to the role it plays in income distribution |
| Property tax | Central State and Local MunicipalityGovernment | Can be applied at all government levels since land is not mobile |
| Consumption tax | Central and State Government | VAT at state level is very hard to administrate if the states set different rates |
| Specific Consumption tax | Central and State Government | Alcohol, tobacco and petrol can be tagged for financing street and road construction |

Source: Modified version of Table 1.1. Tax Assignment Giugale and Steven B. Webb (2000) p.101.

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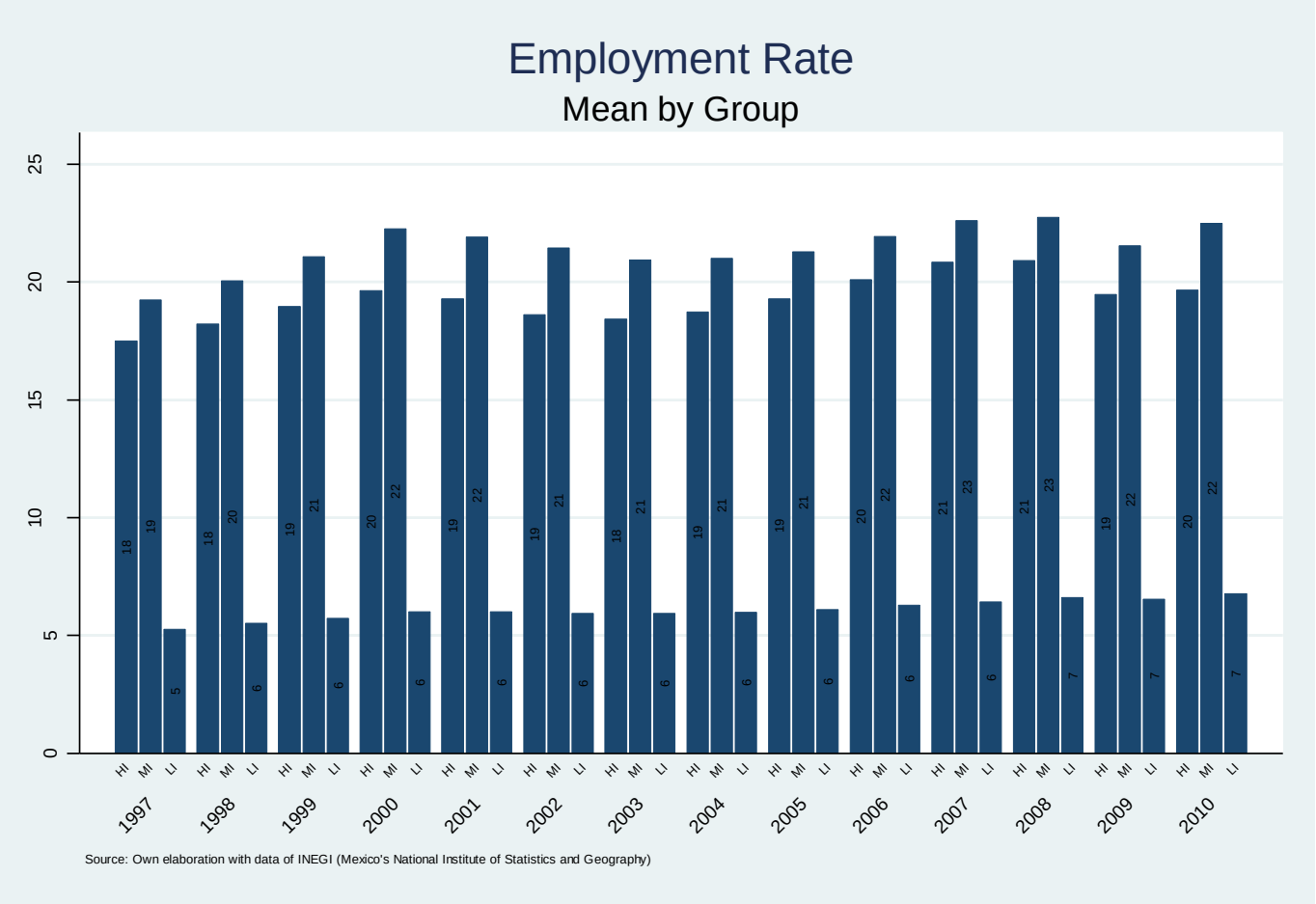
# Table 2.4 Local taxes levied by states 2010

| Local Taxes | States |
|---|---|
| Entertainment and public spectacles | Aguascalientes, Baja California, Coahuila, Distrito Federal, Guerrero, Morelos, Nayarit, Oaxaca, Querétaro, Tlaxcala |
| Allowed, lotteries, raffles, contests, sweepstakes and games | Aguascalientes, Baja California, Baja California Sur, Campeche, Coahuila, Colima, Chiapas (2009), Chihuahua, Distrito Federal, Durango, Guanajuato, Guerrero, Hidalgo, Jalisco, Estado de México, Michoacán, Morelos, Nayarit, Nuevo León, Oaxaca, Puebla, Querétaro, San Luis Potosí, Sinaloa, Sonora, Tabasco, Tamaulipas, Tlaxcala, Veracruz, Yucatán |
| Aquatic parks and spa services | Morelos |
| Sales of lotteries and raffles tickets | Jalisco |
| Payroll or Personal Labour Remuneration Expenses | Aguascalientes, Baja California, Baja California Sur, Campeche, Coahuila, Colima, Chiapas (2009), Chihuahua, Distrito Federal, Durango, Guanajuato, Guerrero, Hidalgo, Jalisco, Estado de México, Michoacán, Morelos, Nayarit, Nuevo León, Oaxaca, Puebla, Querétaro, Quintana Roo, San Luis Potosí, Sinaloa, Sonora, Tabasco, Tamaulipas, Tlaxcala, Veracruz, Yucatán, Zacatecas |
| Professional practice and/or honoraries | Colima, Chiapas (2009), Chihuahua, Guerrero, Hidalgo, Jalisco, Nayarit, Quintana Roo, Tabasco, Tamaulipas, Tlaxcala, Yucatán |
| Used motor vehicles sell/buy | Baja California, Coahuila, Colima, Durango, Michoacán, Nuevo León, Oaxaca, Quintana Roo, Yucatán |
| Used motor vehicles acquisition | Aguascalientes, Chiapas (2009), Chihuahua, Guanajuato, Hidalgo, Jalisco, Estado de México, Morelos, Querétaro, San Luis Potosí, Sinaloa, Tlaxcala, Veracruz |
| Sales of used mobiliary | Baja California, Baja California Sur, Quintana Roo |
| Acquisition of mobiliary | Chihuahua, Nayarit, Zacatecas |
| Used mobiliary domain transfer | Jalisco, Sonora, Tabasco |
| Acquisition of estates | Distrito Federal |
| Local on ownership or use of vehicles older than 10 years | Aguascalientes, Coahuila, Chiapas (2009), Distrito Federal, Guerrero, Hidalgo, Estado de México, Morelos, Nayarit, Oaxaca, Puebla, Querétaro, San Luis Potosí, Tlaxcala, Zacatecas |
| Local on ownership or use of vehicles up to 9 years old* | Aguascalientes, Campeche, Colima, Guerrero, Nayarit, Querétaro, Yucatán |
| Commercial and industry activities | Baja California, Sonora |
| Books, newspapers and magazines commerce | Campeche |
| Land and housing property | Distrito Federal |
| Soil and subsoil exploitation | Baja California, Campeche, Quintana Roo |
| Public instruments and contract operations | Chihuahua, Guerrero, Jalisco, San Luis Potosí, Tabasco, Tamaulipas, Tlaxcala |
| Accommodation services | Aguascalientes, Baja California, Baja California Sur, Campeche, Coahuila, Colima, Chiapas (2009), Chihuahua, Distrito Federal, Durango, Guanajuato, Guerrero, Hidalgo, Jalisco, Michoacán, Morelos, Nayarit, Nuevo León, Oaxaca, Puebla, Querétaro, Quintana Roo, San Luis Potosí, Sinaloa, Tabasco, Tamaulipas, Tlaxcala, Veracruz, Yucatán, Zacatecas |
| Sales of goods with burden by the Special Tax on Production and Services Law | Querétaro |
| Acquisition by disincorporation of Common Goods (Ejido) | San Luis Potosí |
| Registry of estates sales | Chihuahua, Quintana Roo |
| Registry of income from use or temporal use of estates (leasing) | Chihuahua, Guanajuato, Guerrero, Nayarit, Oaxaca |
| Registry of personal income from professional services | Guanajuato |
| Registry of personal income from entrepreneurship | Guanajuato |
| Additions | Baja California, Coahuila, Colima, Chihuahua, Durango, Guerrero, Hidalgo, Morelos, Nayarit, Oaxaca, Querétaro, Sonora, Veracruz, Yucatán, Zacatecas |
| Other State contribution | Guerrero |

Source: Modified version of Table of INDETEC No.161 (2010) p.51.

**Graph 2.3 Employment in Mexican States 1997-2010**



## Table 2.5 Employment in Mexican States 1997-2010

| Group | Variable | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **High incom** | Formal Employment | 1751.27 | 1822.81 | 1896.15 | 1963.77 | 1929.53 | 1861.85 | 1841.99 | 1874.20 | 1929.26 | 2009.75 | 2083.96 | 2091.51 | 1948.14 | 1966.62 |
| **Middle income** | Formal Employment Rate | 1923.57 | 2006.58 | 2108.62 | 2225.28 | 2191.97 | 2145.44 | 2093.00 | 2101.10 | 2128.05 | 2194.36 | 2261.04 | 2274.17 | 2154.17 | 2249.65 |
| **Low income** | Formal Employment Rate | 526.58 | 551.34 | 573.28 | 599.70 | 600.34 | 592.65 | 592.80 | 598.78 | 610.93 | 628.61 | 642.68 | 659.92 | 653.13 | 676.13 |

Considering the data base of workers registered in the Mexican Institute of Social Security, the percentage of workers employed during the period 1997-2010 were between 17 and 23 percent in the high income and middle-income states while in the low income states the percentage was around 5 percent. This is a clear picture of the disparity among regions of states with different levels of development. The size of the informal sector in Latin American economies accounts for about 40 percent of GDP, but rather is perceived as a survival economy (CUTS International, 2009). In Mexico, the informal economy represents 58.7 percent in 2010 (ILO 2012).

## *2.2 Public Finance, Growth and Employment: a review of the literature*

### 2.2.1 Public Finance

Governments pursue sound public finances by raising enough fiscal income in order to provide essential public expenditure for their inhabitants. Public finance refers to the management of income and expenditure components which different levels of government utilise to provide goods and services for their population. Governments canalise resources to relevant areas such as education and health, for the development of their communities while promoting a better distribution of income (Rosen, 2002, p.16). However, management of resources implies taking positive and normative elements into account during the decision-making process. This process is not straight forward since there are trade-offs between taxing certain goods and services or spending resources on certain activities (Auerbach, 2010, p. 1-2).

Fiscal policy can be viewed as the way in which governments promote economic development, by raising different types of taxes and/or incurring in specific expenses, bearing in mind equity, efficiency and distributional considerations. Adjustments in the level and composition of taxes and expenditure have an impact on the aggregate demand and the level of economic activity (Perotti, 2002

p.5-8). According to Vito Tanzi (2008 p.17-18), there are two fiscal instruments which governments commonly use in order to manipulate economic performance: government spending and taxation. In this respect, the level of public spending and its composition are crucial when making policy decisions in order to quantify the potential benefits for the population. A number of questions such as: how should the government employ the available funds, where should it canalise resources and how much should be spent are central when a government seeks to maximise their use of resources. Furthermore, taxes on income, consumption, property and payroll, all bearing a variety of rates and levels, as well as tax expenditures and incentives, offer a diverse range of fiscal possibilities.

Researchers suggest that the role of local governments is crucial for the development of a community. Thus, the involvement of the administrative and political local authorities in a country becomes a necessary condition for sustainable development (Nunes Silva, 2014). Although fiscal policy is synchronised at a central level, local governments are responsible for the effective provision of public goods, where local financial and fiscal development matters for economic development. The unique role of local governments in providing daily services to inhabitants of a community requires the political, fiscal and financial ability to manage their budget wisely (Hou, Y., 2013).

Central government outlines national fiscal policy in order to promote development and growth, but local governments must be involved in the planning and implementation of the policy process. In this respect, Keynesian theory denotes that government spending could impact upon output and employment with the aim of minimizing fluctuations of the business cycle (Bunea-Bontas *et al.*, 2009 p.5). However, the economic literature mainly focuses on the role of central government in stabilising the macroeconomic variables and little has been written about the actual participation of local governments. For instance, there has been a renewed interest in rearranging sub-national finances and economic development with the aim of coordinating city,

regional and national development with a practical focus on policy making (Pike, A., & Tomaney, 2008). For example, with respect to climate change, there has been an increasing number of community initiatives and programmes linked to specific policies and infrastructure programmes in urban areas based on local capacity and resources (Bulkeley, & Castán Broto, 2013, p.1). In this current work is appropriate to take into consideration the fact that central government transfers play a key role in local fiscal planning, since some localities are highly dependent on central government resources. This current study distinguishes income and expenditure components that are local and those that are centrally determined. Thus, I will understand to what extent local policy makers can manage and decide about their own resources or simply depend upon central government transfers. Mexico has witnessed the increasing role of sub-national governmental authorities in social policy agenda setting, which seems to be associated with local political, administrative and financial policies (Medrano and Smith, 2015, p.1). For instance, in 2001 a pension for elderly was implemented in Mexico City and was later imitated by other local governments and the federal government (SDS, 2000). Consequently, local governments should have a more active role in developing their own policy initiatives within the local, regional and national framework.

## *Institutions, Accountability and Transparency*

The institutional framework is a significant element when analysing the effectiveness of any particular policy, since the way laws are enforced and implemented is fundamental to citizens' rights. Moreover, accountability and transparency of public funds are crucial for community satisfaction as I will explain in chapter five. In particular, according to Becker (1983 p.394-396), there are interest groups that compete for political favours and exert pressure in order to maximise their income, by either increasing their subsidies or lowering their tax burden. His finding applies not only to taxation and subsidies, but to public policies which promote efficiency in public services provision where there are market failures. Levy and Walton (2009 p.13-15) stated that in the Mexican economy at federal and local levels, there are powerful groups of interest, such

as: political parties, business and labour groups that pursue as many benefits as possible, much to the detriment of Mexican society. In line with Sorensen (1995, p.137-138), the demand function of local spending is multidimensional since parties' influence politicians' resource allocations, considering legislative committees and public-sector employment framework.

Mexican institutions have developed in a context where there is a lack of transparency and accountability. Therefore, the results derived from this current work, should be contextualised under the scenario that institutions are very diverse among different states and localities in Mexico. This situation can produce diverse outcomes depending on the degree of transparency and accountability of these sub-national organisations. In this context, institutions comprise the framework, including the constitution, laws, regulations and the formal and informal norms of behaviour and their enforcement (North,1993). Institutions are a result of the combination of social, political, structural and economic factors as well as the civil liberties acquired by voters in a particular locality (Crisp and Gwartney, 2012). Moreover, the particular analysis conducted in this current research is applicable to the characteristics of Mexican localities and states. Some recommendations can be derived when conducting a similar study in other countries with different degrees of centralisation/decentralisation between several levels of government. A limitation of the current study is that it is unable to measure the impact of the institutional framework in different localities in Mexico, although for the case of Latin American countries, the control variable "time to start a business" can be a proxy to measure the efficiency of the legal framework of a particular country.

Ugalde (2015, p. 1-27) in his analysis of the Mexican democracy describes how pluralism can in fact increase corruption when institutions do not guarantee the rule of law. This scholar argues that there is no transparency and accountability for resources, for example, subsidies used for parliamentary groups. Moreover, he states that some state governors opted to give some of these resources to opposition parties in order to have good relationships with their local congress

and in return, have their budgets approved. Therefore, instead of strengthening the role of local congress to counterbalance power and guarantee that government revenue is properly spent as well as ensure no corruption, local legislators and authorities have become part of the corruption process. Although important steps have been developed in order to have better legislation in matters of transparency and anti-corruption programmes, the most relevant action is to guarantee the application of the law without exception.

## *Government Revenue*

Government revenue which supports the provision of public goods and services can be derived from several sources: taxable income, non-taxable income and public utilities. Nevertheless, in this current work I focus on direct and indirect taxes. For instance, it is much easier to promote fiscal packages during downturns which cut spending rather than packages that increase the tax burden, because not only they are quite unpopular but they are politically hard to endorse, although being at time, necessary (Shome, 1995). Taxes can be classified according to the taxable base, income or consumption, and they are mandatory. Nonetheless, taxpayers usually want to avoid them, either legally (avoidance) or illegally (evasion). Income taxes on corporations' profit reduce investment, production and employment, while taxes on personal income distort the decision between work and leisure. Consumption taxes increase the cost but do not distort the relative prices of goods and services, therefore, this type of tax encourages investment. Direct taxes cannot be transferred between individuals and can become a disincentive to work, while indirect taxes refer to taxes on goods and services, which in turn, can be easier to levy and more effective in terms of obtaining higher levels of government income. However, direct taxes can contribute to equity in the tax system, while indirect taxes are said to be regressive, since the relative burden for persons which have different levels of income becomes uneven. Moreover, maximising the overall tax burden can imply imposing a greater burden on inelastic goods but, in fact, these types of goods are often basic goods. Additionally, indirect taxes are more efficient and

easier to monitor and administrate than direct taxes. (Pérez Fuentes Alemán, 1995).

Although taxes generate distortions in the economy, indirect taxes do not change relative prices and are more efficient to apply than direct taxes. Ormaechea (2012), Johansson et al. (2008), Angelopoulos et al. (2012) find that reducing direct taxes while increasing indirect taxes can have a positive impact on growth when analysing 64 countries from 1980 to 2000. Nonetheless, the effect of taxes on growth is not conclusive since diverse authors find different results. In the case of Mexico in particular, several studies find a negative relationship between taxes and growth at a national and state level from 1993 to 2011 (Srithongrung and Sánchez-Juárez, 2015; Caballero and López, 2012). However, according to the study of Huang and Frentz (2014) there is no clear evidence that tax increases harm growth, particularly at a state level (p.8, 10), since every study refers to different entities with different socio-economic and political conditions, a diverse range of policies and time periods. Studies from Samaniego (2014), Bania et al. (2007) and Tomljanovich (2004) indicate even a positive effect of taxes on growth in the case of the Mexican economy. In this study, I expect a negative effect of direct taxes on GDP per capita growth and a positive or neutral effect of indirect taxes. Although, my results show a positive overall effect of indirect taxes on growth in Mexico as a country, when considering high, middle and low-income states, the positive effect of indirect taxes holds only in high income states. In my study, I find a positive and significant effect of taxes on growth at a municipal level.

## *Government Expenditure*

Devarajan et al. (1996 p.315-320) propose a model analysing different types of expenditure (productive and unproductive), where growth depends upon the elasticities of substitution between both, which means that not only the productivity of each type of capital is relevant, but also their share. In this current work, the effect of current and government capital expenditure on growth depends upon the level of development of each locality, given by their respective

share according to their local disparities. Although it is understood that certain expenditures could be theoretically more appropriate than others, this study considers the main expenditure components simultaneously and their effect on growth. Gemmell et al. (2012 and 2009), Bassanini et al. (2001), Guillemette (2010), Angelopoulos et al. (2008), Milbourne et al. (2003), Nijkamp and Poot (2004), Bose et al. (2003), Aschauer (2000) and Kneller et al. (1999) find positive growth effects of productive expenditure for transport and communication, education and health, as well as research and development.

Economic growth is positively influenced by the investment in physical and human capital (skills and experience), research and development (particularly oriented to business related activities), while strengthening macroeconomic and financial stability. Even though spending on health, education and research promote growth in the long run, when social governmental transfers are focused on social objectives, their means of financing should be carefully analysed. Moreover, according to Bassanini´s results (2001, p.42-43), greater direct taxes and transfers provoke a decrease in growth, while capital investment promotes GDP per capita growth in 21 OECD economies during the period 1971-1998. Therefore, in this current work I expect a positive (negative) relationship between capital (current) and GDP per capita growth. However, according to Amieva-Huerta (2010, p.252-256) in Mexico from 1970 to 2002, current public spending could be positively related to GDP per capita which means that current public spending is not counter-cyclical and it is highly inelastic due to the institutional committed expenditures of the public sector. Moreover, Amieva-Huerta's analysis rejects Barro's neutrality hypothesis where fiscal policy affects private savings. His findings demonstrate that public current savings have a positive effect on private savings which yields an interesting result: "public investment complements private investment".

According to ECLAC (2010, p.146-165) Mexico increased education expense from 4.0 in 1990 to 5.8 in 2008 as percentage of GDP, a level that ranks third in Latin America. In real terms, this change represented an increase from $197 to

$378 dollars per capita, the second highest after Argentina which spent $489 dollars in 2008. Nevertheless, according to Amieva Huerta (2015), Mexico's payroll for teachers' accounts for 93 percent of total expenditure and only 3 percent is devoted to education infrastructure. Mexican states have covered basic education for the vast majority of their population and coverage is increasing for middle and high schooling. However, quality in education is still deficient, particularly in southern Mexican states.

Regarding health expenditure in Mexico, the sector is fragmented because there are several bodies in charge: IMSS (Mexican Institute of Social Security), ISSSTE (State's Employees´ Social Security and Social Services Institute) and decentralized state public organisations. Some of these bodies undertake similar responsibilities, which generates a duplicity of functions and lack of coordination and low quality, particularly in poor municipalities. The introduction of a popular health insurance scheme has promoted informality since beneficiaries have not transferred to the formal sector and they are not entitled to pension, disability or life insurance. The popular health insurance programme is financed with federal and state resources Levy (2008, p.70-83). Additionally, the private sector which provides health care is not properly regulated and resources are directed to curative rather than to preventive medicine.

Mexico devoted 2.8 per cent of GDP to health expenditure in 2008-2009. This level is lower than the average for Latin America which was registered at 3.2 per cent of GDP and the levels of Argentina, Brazil and Chile which were 5.3, 5 and 3 per cent of GDP, respectively. With respect to social security and assistance, Mexico spending accounts for 3.7 per cent of GDP, while the average for Latin America is 8 percent of GDP and 11.1, 13.6 and 6.9 per cent of GDP for the abovementioned countries (ECLAC, 2010, p. 170). In 2010, total health spending in Mexico is the second lowest among the OECD countries at 6.2 per cent of GDP, while the OECD average is 9.5 per cent of GDP (OECD, 2010,

p.1). Moreover, the pressure for public finances is huge because of the demographic transition and the ratio of claimants to contributors is growing.

It is important to acknowledge that the government budget includes entitlement programmes such as social security, welfare programmes, etc. In 2000 about 75 percent of the U.S. budget was uncontrollable (Rosen, 2002, p.14). Furthermore, when breaking down expenditures by level of government federal government accounted for about 50 percent of direct expenditures, and approximately 21 and 27 percent were related to state and local governments respectively. In Mexico, in 2010 around 77 percent of government expenditure was non-programmable and 23 percent programmable. Capital expenditure accounted for 24.1 percent of programmable expenditure while current expenditure constituted 75.9 percent, including wages and salaries (43.8), pensions (16.6) and social programmes (17) among others. Transfer to local governments accounted for one third of total expenditure (SHCP, 2010).

Gemmell, Kneller and Sanz (2009) report a positive relationship between transport and communication, as well as education and health expenditures with growth. An increase of 1% in spending on each of the above-mentioned categories generates a rise in growth of 0.12%, 0.10% and 0.05% respectively. These results contrast with OECD calculations of ±0.1%. The World Bank 2007 report on fiscal policies in twelve emerging economies demonstrates that productive expenditure (on infrastructure, education and health) has a positive impact on growth (ibid). Gemmell et al.'s (2009) results have shown that changing OECD expenditure towards productive spending could increase growth, however, they recognize that the government should spend on social items (Barrios, 2009 p.25, 26, 30, 31, 34). In this current study, I confirm the positive relationship of education with growth, and when considering total government investment in Mexico, I also find a positive relationship with GDP per capita. However, in this work I find a positive relationship between growth and subsidies at a national and a sub-national level in Mexico, although, the distortions of these type of instruments are well known by modifying production,

overinvestment in subsidised activities and the inefficient use of resources.

In the current analysis, the economic strength or weakness of each locality depends upon its reliance on federal transfers and its particular fiscal stance in economic development, because outcomes in terms of GDP per capita differs according to whether a state/province is in the low-income, middle income or high-income group. In 22 OECD economies from 1970 to 1995 Kneller et al.(1999 p.171) find that productive government spending increases growth, while non-productive does not. In the current study, the effect of government investment on growth in Mexico at a country level is not significant, however, some differences arise at sub-national level depending upon the level of income of each locality.

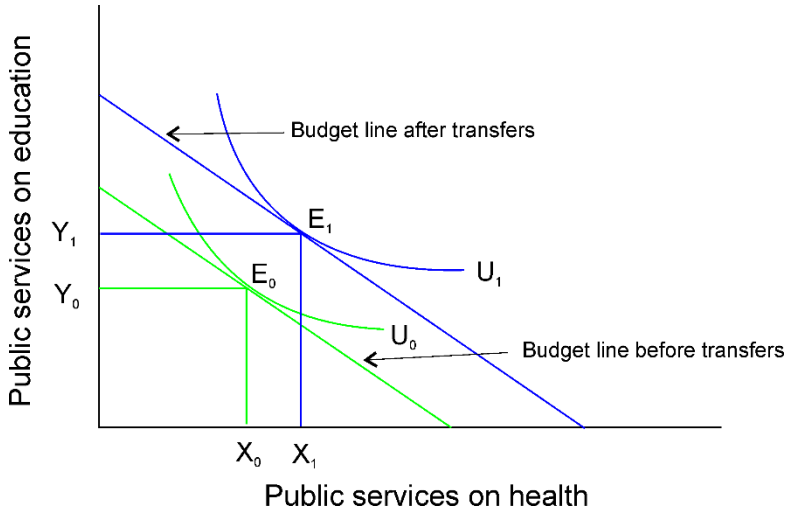
## *Transfers*

For local governments, a significant source of revenue derives from transfers from the central government, therefore, the relevance of a separate analysis. Arvate and Rocha (2013), De Mello Jr. (2002), Kappeler et al. (2013), Binswanger-Mkhize et al. (2012) illustrate the positive effect of transfers on growth and local investment. Sour (2013), Caldera (2013) and Abbot et al. (2015) refer to the relevant role of transfers in local governments. According to the study of Garcia (2010 p.239, 248) non-earmarked transfers show a positive relationship with growth considering average data for the period between 1997 and 2005 for Mexican states, however, a negative association was found between earmarked transfers and growth.

The fact that there are vertical and horizontal imbalances between sub-national governments, which means that localities have different capacities for raising taxes and providing public services, makes it necessary for the central government to provide transfers as an equalisation mechanism. Understanding the different types of transfers from central to local governments gives insight in this current work regarding their impact on growth and employment. There are

two ways to transfer resources from one level to the other: revenue sharing or grants. With respect to the first, tax bases can be shared or several taxes can be pooled, while grants can be conditional (earmarked) or unconditional (non-earmarked). These transfers can be flexible or subject to certain restrictions and can sometimes require matching elements from the local government (IMF 1997 p.73).

**Graph 2.4 Effect of Unconditional Transfers**

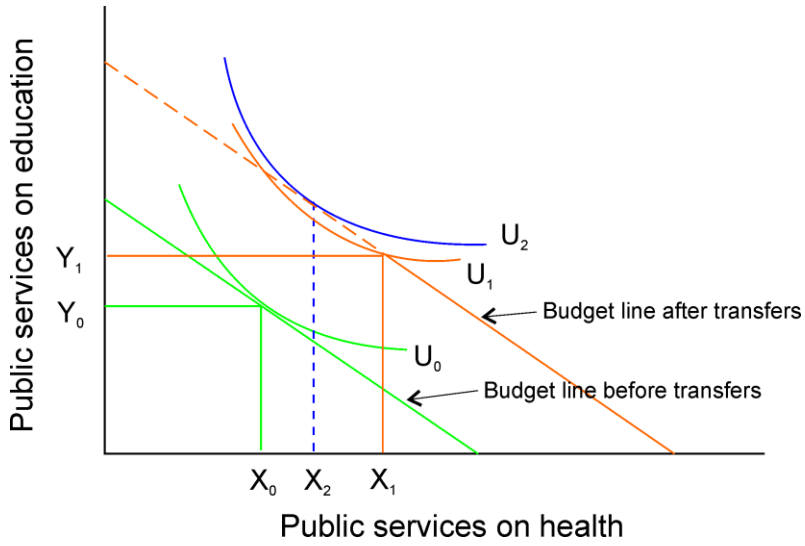



Source: Cullis, J., Jones, P., & Jones, P. R. (2009 p.379).

Shah (2006 p.1-9) stated that around 60% of local spending is financed by intergovernmental transfers in developing countries. In particular, unconditional transfers have no restrictions and local governments can use them to increase their expenditure in any area that they consider suitable according to their local policy objectives. As can be seen in Graph 2.4 with no transfers from the central government, locality provides Xo and Yo units of public services with a utility of Uo. However, when it receives a fixed amount of transfers (comparable to a check from the central to the local government), the budget line shifts to the right and the locality is able to provide a higher level of the public goods Yo and Y1 with a higher level of utility U1. Thus, there is an increase in the level of public goods provided, and for a given expenditure level (Eo and E1), the utility is higher with the provision of non-conditional transfers. Regarding conditional

transfers, these can be utilised to promote certain economic activities or programmes in order to pursue country specific policy objectives. In the case of conditional non-matching transfers, resources are spent on a particular activity that the central government considers as a high-priority in order to attain a certain level of public services in education and health, for example, thus complying with national standards. In this situation, the local authority should spend the amount provided by the central government on the provision of the particular good or service that is being promoted, which leads to a corner solution as can be seen in Graph 2.5. The provision of public goods moves from Xo to X1 because the X1 is established by the central government and not by the local government and its local preferences, which otherwise would have been X2. As it can be appreciated, the utility U1 is a corner solution with lower utility than U2 which would have been obtained if the locality had chosen X2 according to its own local preferences. Nonetheless, if transfers include matching requirements, the transfer from the central government plays the role of a subsidy for local spending, and the local authority needs to spend an additional amount of resources on the specified activity, to a certain extent.

**Graph 2.5 Effect of Conditional Transfers**




Source: Cullis, J., Jones, P., & Jones, P. R. (2009 p.380).

In this current work, I expect non-earmarked transfers (unconditional) to have a positive relationship with output per capita growth because they can be freely utilised by local governments, according to their local needs, which would presumably be more efficient due to the fact that local authorities are closer to the place the public services are provided, although, an important issue is the accountability for those resources. However, in the case of Mexico, the central government cannot impose penalties on local governments when the application of resources is unclear and responsibility lies in the local government itself.

In the case of earmarked transfers, resources in Mexican states and municipalities are mainly canalised to education, health, social assistance and infrastructure, public security and pensions. I expect that the relationship of earmarked transfers (conditional) and output per capita growth is positive, since these resources are given to states with equalisation purposes, in order to account for regional disparities. Nevertheless, the rigidity on the application of earmarked transfers can result in an inefficient allocation of governmental resources, considering that local authorities have poor financial accountability. In the case of earmarked transfers, central government and the Chief Audit Office in Mexico can audit these funds and make recommendations to the local government but no sanction is considered if the local authority does not comply with the law. In Mexico, local governments rely heavily on transfers from the central government; however, transfers are not properly monitored and enforced which in turn leads to inefficient use of resources, corruption and lack of accountability. Moreover, when some local governments, particularly those from low income states, perceive their total income as exogenous, because a huge amount of it derives from transfers from the central government, there is a risk of higher levels of spending, indebtedness and lower fiscal effort to collect local taxes. Furthermore, the less developed localities have weaker institutions, budget controls and administrative procedures.

Turning to matching requirements, these do not consider the different levels of capabilities of different local governments. High income localities might have

the capacity for providing certain public services as expected by the central government, but low-income ones might not be able to match any requirement, although their needs can be much higher than those of high income localities. Therefore, in order to ensure central government's desired outcomes, conditional non-matching output based transfers would appear to be recommendable, which in turn, includes localities' performance on certain indicators. These can be established by linking the transfer with inputs and outputs, since outcomes and the impact of transfers are beyond government's control (Chief Audit Office Report, 2010).

Although this current study does not focus on pro-cyclicality of fiscal policy variables, I acknowledge that several authors have found either pro-cyclical or countercyclical pattern of transfers. Lee and Sung (2007 p.457, 458) analyse the effectiveness of fiscal policy during business cycles in 94 economies from 1972 to 1998 and they find that government's current expenditures, subsidies and transfers are counter-cyclical, while taxes and capital expenditures are pro-cyclical. A comparison between OECD and non-OECD countries reveals that government expenditure responds more counter-cyclical in OECD countries. According to Caldera Sanchez (2013 p.29) revenues at a local level during the period 1989-2010 in Mexico are highly volatile since most transfers represent a fixed percentage of federal income sharing pool (which includes oil revenues), therefore, revenue volatility can have a negative impact on public spending. Abbott, Cabral and Jones (2015, p.16-18) find that expenditure and intergovernmental transfers are pro-cyclical and political networks are relevant in Mexico.

### *2.2.2 Growth*

The theory of recent macroeconomics began with Keynes in 1936, where governmental intervention could influence consumption and investment. By manipulating the marginal propensity to consume through taxation or interest rates an active fiscal policy could stimulate effective demand to increase output. Subsequently, the following year, John Hicks formalized the main aspects of

Keynesian theory and developed the IS-LM model which explains the interaction between the goods market and the financial market, where fiscal and monetary policy are represented through changes in the IS-LM curves.

The pioneer growth model was developed by Robert Solow (1956, p. 66-94). In this he describes a model for long-run growth that considers the Harrod and Domar assumptions. The central assumption regarding the production function is that it has constant returns to scale. Solow considers a production function that depends upon two factors of production: labour (L) and capital (K) with an index of productive efficiency (A).

Y= F (K, AL) where $\dot{A} = gA$ (2.1)

Output is a flow variable produced at a given period but t is omitted to simplify notation and K and L are stock variables measured at a given point in time. Thus, A increases labour input while keeping capital unchanged and g is a proportional rate of change of technology. Under the assumption that the economy is working at full potential and considering that capital (K) depreciates at a constant proportional rate δ. The rate of accumulation of capital is given by the saving rate $sY$ where s is a constant fraction of income. Therefore, the equation of capital accumulation is given by:

$\dot{K} = sY - \delta K$ (2.2)

and

$\dot{L} =$ nL where n is the population growth (2.3)

Considering that the marginal product of each factor of production is positive but diminishing in its quantity and denoting output per effective worker, capital per effective worker and that the marginal products should be equal in equilibrium; therefore, the long-term solution would be a function of *s*, *n*, *g*, δ, $K_o$ and $L_o$ which represent the saving rate, population growth, technological change, depreciation rate and the initial level of capital and labour respectively. In this model, the saving and the population rate do not influence the long term steady state of growth since they are considered exogenous. The only variable which influences growth in the long run is technology.

The Keynesian contention was that fiscal policy could play a major role in stabilising the economy during recessions. However, Milton Friedman in 1963 analysed the trend of monetary history in the United States and concluded that the role of monetary policy is fundamental to explain movements in output. Until now, the debate of the importance of fiscal or monetary policy still continues as both play a key role in the development of the economy. On the one hand, taxation, spending, allocation and distribution of resources (fiscal policy) are mainly implemented by the Ministry of Finance. On the other hand, the Central Bank is in charge of interest rate and inflation targets (monetary policy). Both are important for stability and growth. Adam (2010) analysed optimal fiscal and monetary stabilisation policies arguing that the former establishes interest rates and the latter decides the amount of public spending, taxation levels and debt. Effective fiscal policies along with monetary measures are determinants for economic recovery during recessions (Spilimbergo et al., 2008 p.2-3). Likewise, Terzi (2010, p.10-11) acknowledged that government spending and taxation can become a powerful tool in aggregate demand adjustment. Thus, it is imperative to quantify the impact on consumption and investment via tax reductions that encourage firms to invest and householders to consume, as well as the composition of public expenditure on: infrastructure, research and development, goods and services, housing, education or health sectors. Government spending can impact upon output and employment with the aim of minimizing the fluctuations in the business cycle (Bunea-Bontas et al., 2009 p.5).

## *Endogenous Growth Theory*

Growth is an outcome of forces within the economy and, therefore, human capital, technology, innovation and, in general, knowledge have a huge impact on economic development patterns. Romer (1986) considered a long-run growth model with endogenous technological change with increasing returns to scale of human capital. Similarly, Lucas (1988) referred to physical and human capital accumulation, as mechanisms of growth development. Barro (1980 p.103-125) developed a growth model that incorporates the public sector as follows:

Household utility is represented by:

$$U = \int_0^{\infty} u(c)\, e^{-\rho t} dt \tag{2.4}$$

$\rho > 0$

where c is consumption per person and ρ is time preference. Population is constant. The marginal utility of consumption u(c) has a constant elasticity of - $\sigma$

The production function is:

$$y = \boldsymbol{\phi}(k, g) = k * \phi\left(\frac{g}{k}\right) \tag{2.5}$$

where y is output per worker, k is the quantity of capital and g is government consumption

Government expenditure is financed by flat rate income tax $\tau$

$$g = T = \tau y = \ \tau * k * \phi\left(\frac{g}{k}\right) \tag{2.6}$$

where T is government revenue and $\tau$ is the tax rate

therefore, the marginal product of capital is:

$$\frac{dy}{dk} = \phi\left(\frac{g}{k}\right) * \left(1 - \phi' * \frac{g}{y}\right) = \ \phi\left(\frac{g}{k}\right) * (1 - \eta) \tag{2.7}$$

$0 < \eta < 1$

where $\eta$ is the elasticity of y with respect to g

In the case the Government also finances services which are in the consumer utility function, then the share of productive and non-productive expenditure would determine long run growth (For further detail in the maximisation process see Barro 1980). In this sense, productive expenditure such as education, health, research and development and technology represent a considerable boost for opportunities for endogenous economic growth and affects the productivity of the private sector, while unproductive expenditure only raises individuals' welfare and has a negative effect on economic growth (Aghion *et al.*, 1998 p.26-27). Moreover, a taxation scheme applied in a locality could distort investment and labour decisions and hence, enhance or inhibit overall development in an economy.

Devarajan et al. (1996 p.315-320) proposed a model analysing different types of expenditure (productive and unproductive) where the production function to be considered is:

$$y = f(k, g1, g2) = \left[\alpha k^{-\zeta} + \beta g1^{-\zeta} + \gamma\beta g2^{-\zeta}\right]^{-1/\zeta} \quad (2.8)$$

where

k = capital stock

g1 = productive capital expenditure

g2 = unproductive capital spending

and government constraint is given by

$$\tau y = g1 + g2 \quad (2.9)$$

where

$\tau$ = flat rate income tax

and

$g1 = \emptyset\tau y$

$g2 = (1 - \emptyset)\tau y$

where

$\emptyset$ represent the proportion of productive government expenditure, and

$(1 - \emptyset)$ represent the proportion of unproductive government expenditure

However, Devarajan does not analyse the financing of funds and different types of taxes, while in this analysis I am also considering the sources of financing.

In his model, the representative agent maximises its welfare considering the following utility function by selecting consumption c, capital k and $\rho$ the rate of time preference:

$$U = \int_0^{\infty} u(c)^{-\rho t} \tag{2.10}$$

Subject to

$$\dot{k} = (1-\tau)y - c \tag{2.11}$$

$$u(c) = \frac{c^{1-\sigma}-1}{1-\sigma} \tag{2.12}$$

After the maximisation process, the steady state growth rate of consumption (λ) can be related to the share of different types of expenditure as follows:

$$\frac{d\lambda}{d\emptyset} = \frac{\alpha(1-\tau)(1-\aleph)\left[\alpha\tau^{\zeta}\right]^{-(1+\zeta)/\zeta}\left[\beta\emptyset^{-(1+\zeta)}-\gamma(1-\emptyset)^{-(1+\zeta)}\right]}{\sigma\left[\tau^{\zeta}-\beta\emptyset^{-\zeta}-\gamma(1-\emptyset)^{-\zeta}\right]^{-1/\zeta}} \tag{2.13}$$

Therefore, growth would depend upon the elasticities of subsitution, which means that not only the productivity of each type of capital is relevant, but also its share. In this respect, the hypothesis of my work contends that the effect of government capital expenditure on growth depends upon the level of development of each locality, given by their respective share, according to their local disparities. In the current study, I focus on resources derived from direct and indirect taxes, transfers and social contributions, while simultaneously analysing subsidies, current and capital outlays in different levels of government. The impact of each fiscal variable will depend upon the level of government involved. Moreover, there has been a large set of empirical applications characterised by relating long run average growth rates of real per capita GDP to a list of structural and policy-related variables.

## *Government Budget Constraint Models*

In these types of models, the government plays an active role in economic growth by influencing GDP development through levying various types of taxes

and allocating resources to different types of expenditures. In particular, Gemmell (2012 p.1-35) and Kneller, Bleaney & Gemmell (1999, p.171-190) consider government budget constraint models where the financing of the spending is crucial for growth development. In this respect, the focus of the current analysis is precisely to find the most suitable income-expenditure combinations which would in turn generate higher growth outcomes.

$$g_{it} = \alpha + \sum_{i=1}^{k} \beta_i Y_{it} + \sum_{j=1}^{m} \gamma_j X_{jt} + u_{it} \quad (2.14)$$

where

$g_{it}$ = Growth in country i at time t

$Y_{it}$ = Non-fiscal variables

$X_{it}$ = Fiscal variables

According to my main hypothesis, the local government would maximise each type of revenue in order to be able to raise enough resources to provide local public services, taking into consideration population characteristics such as education and health, subject to revenue resources given by the budget constraint and considering there is a minimal amount of expenditure (irreducible expenditure) which needs to be completed. Gemmell, Kneller and Sanzell (2009) find that there is a strong and positive association between health and education expenditure and growth. The main difference in their model with respect to the one presented in this thesis, is that they do not consider all the fiscal variables simultaneously but instead they alternate either income or expenditure variables. Moreover, Pechar & Andres (2011) consider that education policies should be linked to desired goals and outcomes. Peter et al. (2010) demonstrate that the welfare state and educational policies pursue the reduction of social inequality. Governments get involved in the health sector as well in order to protect vulnerable sectors of the population that otherwise could not be able to get access to health services. The aid provided can be through a payment or a subsidy for health care while regulating drugs and medical devices (Stiglitz 2000 p.304). In Mexico, the information for states and municipalities was non-existent by function of government for the period of the current study,

however, for the Latin American analysis I do have as control variables expenditure per student, health expenditure per capita and R&D spending.

The economics debate about the relationship among taxes and expenditure has been raised for decades, regarding whether or not taxes generate further spending or if expenditures promote higher taxes in the future. In this respect, the tax-and-spend hypothesis developed by Friedman (1978) sustains that modifications on revenue generate further modifications in expenditure. In this current work the objective is to analyse the simultaneous effect of taxes and expenditures on GDP per capita and employment, which means that income and expenditure decisions are made during the same fiscal year for budget purposes, and therefore I do not seek a causality between them. In my work, different combinations of income/expenditure show different GDP per capita and employment levels. It is important to acknowledge that states and localities have fiscal pressures regarding health, education and pension programmes which will eventually increase demand for higher transfers from the federal government (Zycher, 2013). In Mexico for instance, around 90 per cent of total expenditure cannot be reduced or modified according to current expenditures and liabilities such as wages, social contributions and capital expenditures which are being executed in public infrastructure, therefore, the margin for manoeuvring expenditure is very limited.

Furthermore, the spend-and-tax hypothesis supported by Peacock and Wiseman (1979) considers that changes in expenditures will provoke changes in revenues. Dada et al. (2013 p.50) report strong evidence that Peacock and Wiseman's hypothesis works in Nigeria, utilising time series data on government revenue, government expenditure and GDP for the period 1961-2010. As mentioned previously, the main hypothesis of my work essentially focuses on the importance of considering both, disaggregated components of revenue and expenditure when evaluating the impact on growth and employment. The relationship between them cannot be undermined and the combination of several

taxes and expenditures applied at a local government can make a difference to their overall local development.

### *2.2.3 Employment*

In 1930, there was the emergence of labour economics focused on employment legislation, labour unions and collective bargaining. This institutional perspective had an interdisciplinary approach embracing in its scope law, history and economics while the neoclassical framework referred mainly to the operation of markets based on the underpinning assumptions of a competitive and efficient market (Kaufman,1993, p.84-91). A new generation of labour economists emerged by the end of the decade and since then, there has been three phases of labour economics. The proponents of the first phase considered labour market transactions to have particular, complex and significant qualitative and quantitative aspects that simple microeconomic theory could not explain, therefore, labour market could not be treated simply as an extension of microeconomic theory. In this phase, Kerr (1988 p.1-23), Dunlop (1988 p.29-34) and Kaufman (1988 p.145-203) focused on a simple neoclassical theoretical framework with rational expectations and competitive market of supply and demand. A more in-depth approach and analytical study of the determinant factors of the labour market considering labour market imperfections, collective bargaining and protective labour legislation. Case studies emerged as an empirical approach and became a key tool for understanding institutional frameworks in a pragmatic way.

The second stage during the fifties, focused on labour market outcomes instead of the institutional framework and its empirical applications. (Jacobsen and Skillman, 2004). This approach dealt with adjusted principles of supply and demand focusing on human capital as a tool to explain market transactions within the context of an institutional framework and in-depth econometric analysis. The last stage, occurring during the sixties and seventies, was characterized with

thorough analysis of human capital, in addition to the study of contractual difficulties, organizational, transactional and structural failures. Models of strategic interaction (game theory) with imperfect information and contracts, together with sophisticated econometric analysis and more extensive data sets (ibid). Utilising the conventional supply and demand model of the labour market, proponents of contemporary labour economics viewed employment as a complex exchange relationship, since contracts have costs of transaction. Moreover, the structural relationship in the workplace depends on the allocation of property rights and the compensation schemes are not straight forward. There are five variables that affect the structure of the labour market: education, work experience, ability, work effort and workplace disadvantages. (Jacobsen and Skillman, 2004, p.9-19; 108).

## *Employment in a Macroeconomic model*

Finn (1988) developed a real business cycle model which evaluates the effect of government expenditure. In this context, Carvallo (2005 p.1-38) described a model that includes households, the private sector and government. The former consumes final goods and supply labour to the private sector and to the government.

The budget constraint for the households is:

$$C_t + I_t = (1 - \tau_t^n) W_t n_t + \left(1 - \tau_t^k\right) R_t^k k_t + \delta \tau_t^k - T_t \qquad (2.15)$$

where Ct is consumption It investment and $\tau_t^n$ and $\tau_t^k$ are the personal and capital tax rates; $W_t$ is the real wage is, $n$t the labour supply, $k_t$ and $R_t^k$ are the capital stock and return respectively, $\delta$ the depreciation rate and T the lump sum taxes paid.

Private $(Y_t^P)$ and government $(Y_t^G)$ production functions are:

$$Y_t^P = (A_t N_t^P)^{\alpha} K_t^{1-\alpha} \quad \text{where } 0 < \alpha < 1 \qquad (2.16)$$

$A_t$ is the level of technology, $N_t^P$ the number of hours supplied to the private sector $K^t$ is the capital stock

$$Y_t^G = (A_t N_t^G)^{\gamma} Z_t^{1-\gamma} \quad \text{where } 0 < \gamma < 1 \qquad (2.17)$$

$A_t$ is the level of technology, $N_t^G$ the number of hours supplied to the government $Z^t$ are the government purchases used in the production

The government constraint is given by:

$$G_t + W_t N_t^G = \tau_t^k R_t^k k_t + \tau_t^n W_t n_t - \delta \tau_t^k + T_t + Y_t^G \quad (2.18)$$

Therefore, government consumption of goods plus the wages paid to government workers is equal to taxes received from capital (including depreciation) and labour, including lumps sum taxes and production.

Consequently, the aggregate constraint for the economy would be:

$$\mathrm{C}_t + \mathrm{I}_t + \mathrm{G}_t + W_t N_t^G = Y_t \quad (2.19)$$

Additionally, if I consider the national account approach, I can derive that the production of the economy is the sum of all factors of production, therefore, Yt would be the sum of the rents from labour ($\mathrm{R}_{Lt}$), capital or land ($\mathrm{R}_{Kt}$), interests ($\mathrm{i}_t$), profits ($B_t$) , amortization ($A_t$) and taxes minus subsidies ($T_t - S_t$) [Blanchard & Wolfers, 2000, p.1-40]

$$Y_t = \mathrm{R}_{Lt} + \mathrm{R}_{Kt} + \mathrm{i}_t + B_t + A_t + (T_t - S_t) \quad (2.20)$$

There is a lot of scope for research investigating the link between labour market and fiscal policy. This current study only covers authors who have offered a general description of labour market imperfections and their implications for fiscal policy. Under a new Keynesian framework, where nominal rigidities are present and adjustments are imperfect, output is demand determined and an increase in government spending raises labour demand and output. In this case, even though a negative wealth effect shifts the labour supply curve to the right (as agents feel poorer), the demand effect is stronger (there is price stickiness), and consequently, output, real wages and employment levels go up (Canova, 2011b). These models can have several market failures, such as wage and price

stickiness, which imply that the economy does not reach full employment. Therefore, the government needs to apply appropriate fiscal and monetary policies in order to attain economic stability and growth.

## *Transfers and the Labour Market*

According to a study developed by the US Advisory Commission on Intergovernmental Relations, and United States of America (1977 p.56) there are several factors that can affect public employment in terms of intergovernmental organisation and diverse types of grants. This situation can result from higher employability in a particular sector that is being stimulated by use of a particular grant, or one that is indirectly affected by the complementarity of certain goods or services linked to the activity being promoted. Higher employment could be attained deriving only from the income effect since the localities have more resources to spend on a particular activity. In my model, I will analyse the relationship between fiscal variables, transfers from central governments in particular, and their relationship with employment. I expect that taxes levied have a negative relationship with employment and that transfers have a positive relationship with the rate of occupation in a local economy.

I find a positive association with transfers, which means that local governments could in fact employ those additional resources to pay wages and salaries of public employees.

Fatás and Ilian (2001 p.5-8) argue that government spending has a positive effect on employment because when government increases expenditure, it boosts economic activity. They demonstrate that government spending is expansionary when the multiplier is larger than one. In my model, I find no significant relationship with capital government expenditure in Mexico as a whole, but when considering different states according to their level of income, I find a negative relationship with governmental capital expenditure in low income states. This

can have a justification following Devarajan analysis due to misallocations of public spending.

Furthermore, in Mexico, I find a positive relationship between non-earmarked transfers and employment at a state level in low income localities and in low-income municipalities as well, which in turn could indicate that resources are devoted to current expenditure by hiring more governmental employees.

**Table 2.6 Summary of several empirical studies**

| Author | Sample | Topics Analysed | Method | Main Results |
|---|---|---|---|---|
| **INCOME** | | | | |
| **Srithongrung and Sánchez-Juárez (2015)** | 32 Mexican States | Fiscal Policy and Growth | Error Correction Model | ➢ Negative relationship between taxes and growth.<br>➢ Public investment has a positive effect on growth. |
| **Bania et al. (2007)** | 50 US states (1962-1997) | Growth, Taxes and Expenditure | FE and GMM | ➢ The effect on taxes utilised in productive inputs first is positive but later on turns to be negative. |
| **Tomljanovic (2004)** | 50 US states (1972-1998) | State Policy and State Economic Growth | FE | ➢ Taxes affect growth only in the short run. |

| Author | Sample | Topics Analysed | Method | Main Results |
|---|---|---|---|---|
| **EXPENDITURE** | | | | |
| **Angelopoulus et. al. (2008)** | 64 developed and developing<br>4 5-year periods from 1980 to 2000 | Government size and economic growth | OLS | ➢ Efficiency of the public sector depends upon both factors: the size of the government and the combination of resources utilised considering input-output efficiency indicators of the public sector<br>➢ The allocation of resources and the efficiency of the public sector is fundamental in order to derive the "size-efficiency mix" which is optimal for a government to achieve<br>➢ In their study, they explicitly link the GDP per capita with the efficiency measures (cost effectiveness of the public sector in 4 areas: administration, |
| **Lee and Sung (2007)** | 94 OECD and non-OECD<br>(1972-1998) | Fiscal Policy Business Cycles & Stabilisation | OLS & 2 Methods of Detrending. | ➢ Government's current expenditures, subsidies and transfers move counter-cyclically, while taxes and capital expenditures move pro-cyclically<br>➢ Government expenditure responds more counter-cyclically in OECD countries |
| **Bassanini et al (2001)** | 21 OECD<br>(1971-1998) | Economic Growth Policies & Institutions | Pooled Cross-Country Time Series | ➢ Economic growth is positively influenced by the investment in physical and human capital (skills and experience), research and development (particularly oriented to business related activities)<br>➢ Spending on health, education and research promote growth in the long run<br>➢ Greater direct taxes and transfers provoke a decrease in output per capita<br>➢ Stock market capitalisation is positively related to investment and output per capita |

| Author | Sample | Topics Analysed | Method | Main Results |
|---|---|---|---|---|
| **Gemmell, Kneller, Sanz (2012)** | 17 OECD (1970- 2008) | Expenditure & GDP growth | Pooled Mean Group | ➢ The method of financing any expenditure matters, whether taxes are raised, deficits are incurred, or reductions in specific expenditure is realised.<br>➢<br>➢ Positive growth effects for transport & communication, education and health expenditure and negative effects for social welfare spending. |
| **Gemmell et al. (2008)** | 17 OECD (1970-2004) | Expenditure & GDP growth | Pooled Mean Group | ➢ There is a strong positive association between transport & communication, education and health expenditures with growth |
| **Milbourne et al (2003)** | 74 Countries Non-Oil economies (1960 and 1985) | GDP per capita Growth | Cross-Country OLS | ➢ Positive relationship between public investment and economic growth in the long run |
| **FISCAL CONSOLIDATION** | | | | |
| **Guillemette (2010**) | Canada (10 year projections) | Fiscal Consolidation | Medium-term Fiscal Simulation Model | ➢ Evidence shows that successful fiscal consolidations rely on spending control rather than in tax increases.<br>➢ Growth can be achieved if productive expenditure is utilized and proper fiscal rules are implemented in order to enhance budgetary consolidation |

| Author | Sample | Topics Analysed | Method | Main Results |
|---|---|---|---|---|
| **Kneller et al (1999)** | 22 OECD (1970-1995) | GDP per capita Growth | PANEL | ➢ Distortionary taxation reduces growth, while non-distortionary taxes does not reduce it<br>➢ Productive government spending increases growth, while non-productive does not increase it |
| **TRANSFERS** | | | | |
| **Sour Laura (2013)** | Mexican Local Governments (1990-2007) | Flypaper Effect | Fixed and Random Effects | ➢ Evidence of the flypaper effect has been found in Mexico, however, asymmetric behaviour has been acknowledged at a local level.<br>➢ Non-earmarked transfers have a greater effect on local government spending than an equivalent increase on income of the population at those localities. |

## *2.3 Several growth methodologies*

### 2.3.1 Pooled Mean Group

Gemmell *et al*. (2012 p.1-23) analyse the effect of different types of expenditure on economic growth in 17 OECD countries during the period 1970-2008. The estimated equation considers growth of GDP in country i at time t as function of total government expenditure as percentage of GDP, E, and the share of each expenditure category $e_1$:

$$g_{it} = \dots \gamma_1 \left(\frac{E}{GDP}\right)_{it} + \gamma_2 \left(\frac{e_1}{E}\right)_{it} + \gamma_3 \left(\frac{R}{GDP}\right)_{it} + \gamma_4 \left(\frac{D}{GDP}\right)_{it} \dots \quad (2.21)$$

Considering the budget constraint, E, expenditures have to be financed by taxes where R represents total tax revenues and D represents budget surplus or deficits.

Since $D = R_{it} - E_{it}$

$$g_{it} = \dots (\gamma_1 - \gamma_4) \left(\frac{E}{GDP}\right)_{it} + \gamma_2 \left(\frac{e_1}{E}\right)_{it} + (\gamma_3 + \gamma_4) \left(\frac{R}{GDP}\right)_{it} \dots \quad (2.22)$$

Therefore, this equation illustrates the effects of taxes and expenditures as percentages of GDP on economic growth. Afterwards, they apply a "pooled mean group estimation" allowing short run heterogeneity and imposing long run homogeneity.

$$\Delta g_{it} = \emptyset_i (g_{i,t-1} - \beta F_{i,t-1}) + \sum_{k=1}^{K} \alpha_{ik} \Delta g_{i,t-k} + \sum_{m=0}^{M} \lambda_{im} \Delta F_{i,t-m} + \in_{it} \quad (2.23)$$

Where F is a vector of fiscal and control variables and ∅, β, α and λ are parameters to be estimated. They apply this approach in order to control for non-stationary variables, however, they realise that in order to avoid a degrees of freedom problem they have to include each spending category separately, two control variables (investment and employment growth) and two lags.

Gemmell et al. (Barrios, 2009 p.24-27) empirical approach begins by regressing economic growth against budget surplus, distortionary and other taxes, non-distortionary taxes, total expenditure, investment ratio and employment growth. However, when testing public expenditure composition and growth they assume that total expenditure remains constant while switching the 9 different categories of spending: transport and communication; education; health; defence; economic services; housing; general public services; social welfare and recreation. They also test alternative classifications of public expenditure with OECD and IMF data regarding consumption, net investment, current transfers and capital transfers. Moreover, they distinguish between public, merit goods and transfers. The current approach to study expenditure at a state and municipal level is directed to the economic classification: current and capital disbursements.

Overall, although Gemmell et al. considers income and expenditure variables simultaneously, due to the degrees of freedom problem, he is only able to regress budget surplus, distortionary and non-distortionary taxes, one or two at a time, with total expenditure (no disaggregation is made), however, in my analysis I regress simultaneously all relevant income and expenditure variables.

Even though PMG tries to account for heterogeneity between groups in the sample for the short run, still adopts homogeneity in the long-run coefficients, which is not an accurate assumption in my point of view. In fact, according to Sachs JD et al. (2002 p.32), who analyses growth in 14 states of India during 1980 and 1998 finds that richer states experienced some degree of convergence but poorer states divergence was remarkable. Moreover, Durlauf et al. (2005) find that GDP per capita growth diverge over time, situation that is addressed by Battisti et al. (2013 p.2) in his study "Global Divergence in Growth Regressions". According to the United Nations "Report on the World Social Situation 2013: Inequality Matters" income inequality among countries has risen. For the case of Mexico in particular, deep-rooted inequities are the source of weak growth (Levy and Walton, 2009, p.1) and during the period 1980-2000

there is no evidence of statistic convergence, in fact polarization between high-income states and low-income states has augmented (Barriga and Vázquez, 2006, p.842). Additionally, according to OECD Income Inequality Update (2014, p.7) during 2011 in Mexico, people with higher income obtained 30.5 times the income of the poorest, situation that reflects of course at a subnational level as well.

Therefore, considering the restriction of instruments allowed in the model together with the constraint of testing each category separately, instead of testing them simultaneously as this study proposes to do it is a major drawback for the purpose of the current analysis. Moreover, PMG technique can throw biased results when the regressors are correlated with the error term incurring, then, in spurious regressions. Bergheim recognizes that this type of technique was an important estimation during the 1990's but still more research has been addressed in order to consider complex and heterogeneous panels, such as unit root and panel co-integration tests (Bergheim, 2008).

Consequently, the present study utilises fixed effects panel data modelling because of its particular treatment of heterogeneity between groups, which in fact is very ample and thus, averages of their estimates are simply not comparable. That is to say that, for example, the mean of two localities in Group 1 (high income localities) in Mexico for some parameter under research would not be strictly comparable to other two localities in Group 3 (low income localities). Furthermore, among the 2,274 Mexican municipalities which are clustered in 7 groups according to their socio-economic conditions, the range of variability is considerable.

The present study simultaneously analyses taxation and expenditure trends and its impact on GDP per capita growth. This thesis considers fixed effects panel data modelling in order to account for unit-specific structural heterogeneity.

### 2.3.2 Panel Data Models

Panel data is a useful tool in order to analyse a wide range of observations over time, increasing the degrees of freedom and reducing collinearity among explanatory variables and therefore, increasing efficiency of econometric estimates. Consequently, data sets can be comprehensively examined on a more detailed basis compared with cross-section or time-series data methodologies (Hsiao, 2003 p.3). Panel data enables more accurate predictions than cross sectional or time series models alone, since it combines and expands the information on both. This type of models can be used to solve the omitted variables problem, since the information utilised considers inter-temporal and cross-sectional characteristics which naturally adjust the effect of missing variables, thus obtaining consistent estimators. Moreover, there is an "unobserved effect" which refers to an unobserved characteristic of each individual, locality or country that does not change over time. This effect improves the information of the model (Wooldridge, 2002 p.247, 248). However, some drawbacks of this methodology can be the lack of design and incomplete information in the data analysed; some selectivity issues which include short time series dimension or not taking into consideration cross sectional dependence which can lead to incorrect conclusions (Baltagi, 2005 p.4-8). Therefore, the current analysis considers fixed effects and then account for cross sectional dependence, which in fact, make the results robust.

A panel regression considers both, a cross section and a time component, which in turn can be described as:

$$Y_{it} = \alpha + X'_{it}\beta + u_{it} \quad (2.24)$$

Where i denote each individual, household, locality or country from i = 1..……N, and t indicates time from t = 1……..T. $Y_{it}$ is the dependant variable which I want to explain. α is a constant. $X_{it}$ refers to the ith observation of the K explanatory variables while β is the estimated parameter for each K.

$$u_{it} = \mu_i + v_{it} \quad (2.25)$$

Where $u_{it}$ is the error term. $\mu_i$ indicates the unobservable individual effect which is time invariant and $v_{it}$ indicates the remainder of the disturbance.

Rewriting the panel regression in vector form, I would have:

$$Y = \alpha l_{NT} + X\beta + u = Z\delta + u \quad (2.26)$$

and

$$u = Z\mu\mu + v \quad (2.27)$$

Where Z=[lnt, X], δ=[α,β], $l_{NT}$ is a vector of ones dimension and Zμ is a selector matrix of ones and zeros, considering that $\mu_i$are fixed parameters (Baltagi, 2005 p.11).

The basic unobserved effect model for a cross section observation i can be described as:

$$y_{it} = x_{it}b + \mu_i + v_{it} \quad (2.28)$$

Where $x$ can contain variables that change across t but not across i, or components that change across i but not t, and variables that change across both dimensions.

In traditional panel data models, $\mu_i$ is called random effect if it is treated as a random variable or fixed effect if it is considered a parameter to be estimated for each cross section observation i (Wooldridge, 2002 p.251).

Consequently, according to the flexibility and the unit-specific structural heterogeneity of entities in fixed effects panel data models previously described,

the current study will utilise this particular approach because it makes economic sense to assume that there is an idiosyncratic fixed characteristic over time for each state or municipality, which is consistent with the idea that each locality has its own political, social, economic, technologic and institutional characteristics.

### 2.3.3 Generalised Method of Moments

When considering estimation for fixed effects models with a lagged dependent variable (Windmeijer 2014, p.30-31), the first difference model can be:

$$y_{it}-y_{it-1} = \alpha(y_{it-1} - y_{it-2}) + (v_{it}-v_{it-1}) \tag{2.29}$$

Valid instruments for $(y_{it}-y_{it-1})$ would be the lagged levels $y_{it-2}$, $y_{it-3}$ and the moment condition are:

$$E(y_{it-2}\,(v_{it}-v_{it-1})) = 0 \tag{2.30}$$

Considering $\Delta v_i$ is the vector of errors, the first differenced equation is:

$$\Delta v_i = \begin{bmatrix} v_{i3} & - & v_{i2} \\ v_{i4} & - & v_{i3} \\ v_{iT} & - & v_{iT-1} \end{bmatrix} = \begin{bmatrix} \Delta y_{it3} & \Delta y_{it2} \\ \Delta y_{it4} & \Delta y_{it3} \\ \Delta y_{iT} & \Delta y_{iT-1} \end{bmatrix} \tag{2.31}$$

And the matrix of instruments Z is:

$$Z_i = \begin{bmatrix} y_{i1} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & y_{i1} & y_{i2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \ldots\ldots & & 0 & y_{i1} & y_{i2} & \ldots. & y_{iT-2} \end{bmatrix} \tag{2.32}$$

Therefore, there are (T-1)(T-2)/2 moment conditions:

$$E(Z'_i\,\Delta v_i) = 0 \tag{2.33}$$

Consequently, the GMM (Generalised Method of Moments) estimator would minimise:

$$J_N = \left(\frac{1}{N}\sum_{i=1}^{N} Z'_i\,\Delta v_i\right)' W_N^{-1}\left(\frac{1}{N}\sum_{i=1}^{N} Z'_i\,\Delta v_i\right) \quad (2.34)$$

Where $W_N$ is a weight matrix that contains the efficiency characteristics of GMM and therefore $W_N$ is:

$$W_N = \frac{1}{N}\sum_{n=1}^{N} Z'_i\,Z_i \quad (2.35)$$

This estimator is efficient where errors are homoskedastic and not correlated over time, this means

$$E(v_i^2|z_i) = \sigma_v^2 \quad (2.36)$$

Thus, the one step GMM estimator can be given by:

$$W_N = \frac{1}{N}\sum_{n=1}^{N} Z'_i\,A_N Z_i \quad (2.37)$$

Where

$$A_N = \begin{bmatrix} 2 & -1 & & \\ -1 & 2 & & -1 \\ & & -1 & 2 \end{bmatrix} \quad (2.38)$$

However, when there is conditional heteroskedasticity

$$E(v_i^2|z_i) = \sigma_i^2(z_i) \quad (2.39)$$

The efficient two step GMM estimator is

$$W_N(\hat{\alpha}_1) = \frac{1}{N}\sum_{i=1}^{N} Z'_i\Delta\hat{v}_i\,\Delta\hat{v}_i{}'Z_i \quad (2.40)$$

$$\Delta\hat{v}_i = \Delta y_i - \hat{\alpha}_1\Delta y_{i,-1} \quad (2.41)$$

Where $\hat{\alpha}_1$is the one step estimator.

The method of moments based on the first difference estimation is proposed by Arellano and Bond (1991, p.278-293). This estimator includes the linear moment restrictions but generates a large number of instruments (the lagged values of the regressors) in the differenced equation. The estimation can be done either in one or two steps. They apply this estimation method to employment equations in an unbalanced panel of 140 UK companies during 1979-1984.

Their results suggest a long-run elasticity with wage and capital variables. However, Blundell and Bond (1998, p. 115-138) consider that when the autoregressive parameter is large and the time period is short, the first difference estimation has a large finite sample bias and poor precision because the lagged variables are weak instruments. Hence, they propose a system that is an extended version of the linear differenced model which consider additional moment conditions; so, the model incudes not only the first difference equations but supplementary equations in levels with the lagged first-differences as instruments. The results and extension of their previous work shows significant improvement and accuracy. They confirm greater efficiency for the system GMM estimator compared to the difference estimation. Hasan et. al. (2009, p.9), Soto (2009, p.10) and Liang, Z. (2006, p.15) confirm the greater efficiency of the system estimator.

Another approach of the current work is to apply GMM system to my sets of panels in Mexico and Latin America, since N>T and I have a lagged dependent variable and not strictly exogenous independent variables. However, the number of instruments is large with respect to the number of observations and the results are not robust. In this respect, according to Bun & Windmeijer (2010, p.95-97) and Verdier, (2014 p.2-4) Generalized Method of Moments estimation presents a large variance and the presence of weak instruments persist. My final estimation includes system GMM as a matter of comparison in my Mexican states and Latin American data set.

### 2.3.4 Robust Standard Errors with Cross Sectional Dependence

Hoechle, D. (2007 p.287-289) develops an estimator which extends original formulation of "Discroll-Kraay" and applies it to the use of balanced and unbalanced panels. The equation to estimate would be:

$$y_{i,t} = x'_{it}\theta + \varepsilon_{it} \qquad i = 1, \ldots\ldots, N \qquad t = 1, \ldots., T \qquad (2.42)$$

where

$$y = [\, y_{i,t11} \ldots y_{i,T1} y_{2t21} .. y_{NTN}]' \qquad X = [\, x_{i,t11} \ldots x_{i,T1} x_{2t21} .. x_{NTN}]' \qquad (2.43)$$

and

for individual i with a subset of $t_{i1} \ldots, T1$ with $1 \leq t_{i1} \leq \cdots Ti \leq T$The regressors $x_{it}$ are uncorrelated with $\varepsilon_{is}$ for all s,t but $\varepsilon_{it}$ can be autocorrelated.

Therefore, θ can be estimated by OLS

$$\hat{\theta} = (X'X)^{-1}X'y \tag{2.44}$$

The variance and covariance matrix would be

$$V(\hat{\theta}) = (X'X)^{-1}\hat{S}_T(X'X)^{-1}y \tag{2.45}$$

and $\hat{S}_T$

$$\hat{S}_T = \hat{\Omega}_0 + \sum_{j=1}^{m(T)} w(j,m)\left[\hat{\Omega}_j + \hat{\Omega}_j'\right] \tag{2.46}$$

where m(T) refers to the maximum lag where the residuals may be autocorrelated and the modified weights would be:

$$w(j,m) = 1 - \frac{j}{\{m(T)+1\}} \tag{2.47}$$

where high order lags receive less weight and $\hat{\Omega}_j$ would be:

$$\hat{\Omega}_j = \sum_{t=j+1}^{T} ht(\hat{\theta})\ h_{it}(\hat{\theta})(\hat{\theta})' \text{ with } ht\left(\hat{\theta}\right) = \sum_{t=1}^{N(t)} h_{it}(\hat{\theta}) \tag{2.48}$$

That is the t moment conditions $h_{it}(\hat{\theta})$ go from 1 to N(t) where N can vary with t, which makes the estimator valid with unbalanced panels, therefore, the moment conditions of a linear regression model would be:

$$h_{it}\left(\hat{\theta}\right) = x_{it}\hat{\varepsilon}_{it} = x_{it}(y_{i,t} - x'_{it}\theta) \tag{2.49}$$

Therefore, the fixed effects first step estimation would be $z_{it} \in \{y_{i,t}x_{it}\}$

$$\tilde{z}_{it} = z_{it} - \bar{z}_i + \bar{\bar{z}} \tag{2.50}$$

where

$$\bar{z}_i = T_i^{-1}\sum_{t=ti1}^{Ti} z_{it} \text{ and } \bar{\bar{z}}_{it} = \left(\sum Ti\right)^{-1}\sum_i\sum_t z_{it} \tag{2.51}$$

Which corresponds to the OLS estimator

$$\tilde{y}_{i,t} = \tilde{x}'_{it}\theta + \tilde{\varepsilon}_{it} \tag{2.52}$$

These types of models have the great advantage of dealing with autocorrelation, heteroskedasticity and cross-sectional dependence between the cross sections, which in fact is an issue with 32 states and 2,247 municipalities in Mexico, and 20 countries in Latin America, since they are interconnected geographically, politically and economically. Moreover, allowing for unbalanced panels makes this estimator robust with these types of data. In the case of Mexico in particular, my fixed effect growth regression results become robust after applying cross sectional dependence estimator. Early panel data estimators assumed independent errors and homogeneous slopes; cross sectional dependence and heterogeneity were only considered in spatial models but not in standard panels. However, ignoring cross sectional dependence of errors has severe consequences, since the presence of some sort of cross sectional dependence among macroeconomic panel data seems to be the rule and not the exception (Chudik & Pesaran, 2013 p.2).

Fuinhas and Couto (2015, p.148) analyse the relationship between oil consumption and economic growth in 15 oil producing countries during the period 1965-2012. They utilise a fixed effects Driscoll-Kraay estimator in order to account for heteroskedasticity, autocorrelation and cross-sectional dependence present in their panel. Their results demonstrate that oil consumption promotes economic growth.

## *2.4 Fiscal Policy Mix State Analysis*

### 2.4.1 Fiscal policy model, methodology and data

My empirical analysis considers a range of disaggregated income and expenditure variables in Mexico in 32 states from 1994 to 2010. Bearing in mind Gemmell et al.'s (2012) Budget Government Constraint Model, I know that growth can be determined by revenue and expenditure components; however, I additionally include control variables that have been widely used in growth models. Considering simultaneously the disaggregated sources of government revenue and expenditure withholding from an a priori categorisation, I look at the figures to understand their impact on growth. My research is innovative because

it considers simultaneously income and expenditure available data on GDP per capita at different levels of government in Mexico. This study intends to constitute a bridge between macroeconomic fiscal policy and the current budget that local governments utilise in their day to day finances.

I apply a fixed effects panel data model as a matter of comparison ("xtreg" command), however, when allowing for cross sectional dependence in my dataset, my results present a higher efficiency. System GMM is also considered by applying "xtabond2" command, although the estimation is not robust. The Stata command "xtscc" is used as the baseline specification (Hoechle 2007). The specification tests are included before my regressions tables. I provide evidence demonstrating that the main income and expenditure components should be analysed simultaneously when evaluating changes in GDP per capita growth. In order to test my hypothesis, I run regressions with income or expenditure components separately and then together (detailed in the appendix) and my findings show that there is a difference between the coefficients in all three regressions with slightly more significant coefficients in my broader model.

## Fiscal Policy Model

As mentioned earlier, the empirical analysis considers a range of disaggregated income and expenditure variables in Mexico at a state level. Ormaechea (2012), Johansson et al. (2008), Angelopoulos et al. (2012) find that reducing direct taxes while increasing indirect taxes have a positive impact on growth. Arvate et al. (2013), De Mello Jr. (2012), Kappeler et al. (2013), Binswanger-Mkhize et. al. (2012) illustrate the positive effect of transfers on growth and local investment. Sour (2013), Caldera (2013) and Abbott, Cabral & Jones (2015) refer to the relevant role of transfers in local governments. Gemmell, Kneller & Sanz (2012 and 2009), Bassanini et al. (2001), Guillemette (2010), Angelopoulos et al. (2008), Milbourne et al. (2003), Nijkamp and Poot (2004), Bose et al. (2003), Aschauer (2000), Kneller et al. (1999) find positive growth effects of

productive expenditure for transport & communication, education & health, research & development.

## Data and choice of variables

The empirical analysis uses annual data of 32 states from 1994 to 2010. As mentioned in the introduction, the NAFTA is signed in 1994, therefore it is important to contextualise this work under the new economic framework of the Mexican economy, when it begins a new episode of improved trade with its northern neighbours in order to facilitate the trilateral flow of goods and services. The period of study ends in 2010 because of the changes in local budget reporting of the Mexican states, according to the new regulations established in the General Law on Government Accounting. The fiscal policy variables included are direct taxes, indirect taxes, non-earmarked transfers, earmarked transfers, subsidies, transfers and aid, personal services and capital expenditure (for definitions, descriptive statistics and sources of these variables, see Tables 2.7-2.9). It is understood that regressors in a growth model should be carefully selected and robust in order to avoid 'Model Uncertainty' as specified by Temple (2000). However, the particular variables specified by Sala-i-Martin et al. (2004) refer mainly to cross country growth regressions and not to states. According to Durlauf, S. N., Johnson, P. A., & Temple, J. R. (2005, p.646) there should be a closer interaction between theory and practice, considering particular features of the countries of study, in this thesis, the variables selected intend to reflect Mexican state reality.

The regression equation links growth with the fiscal variables afore mentioned as a share of total revenue or expenditure. The control variables employed have been broadly utilised in growth models by Afonso and Furceri (2010), Santiago Acosta-Ormaechea & Jiae Yoo (2012), Johansson, et al. (2008) such as level of GDP, average years of education and population growth; life expectancy has been considered by Bloom, Canning & Sevilla (2004), Hamoudi & Sachs (2000). The empirical analysis of the current study will test if the fiscal variables are related to higher growth. The fact that regressors in growth models among

regions are interconnected geographically, politically and economically has to be accounted for in order to have robust estimators (Chudik & Pesaran, 2013). Consequently, the method of estimation applied will be robust standard errors for panel regressions with cross sectional dependence between 32 states.

According to Gemmell et al. (2012 p.21) 'the fact that the government budget is an accounting identity' means that any change in the sources of funding has necessarily to be equal to the use of resources; therefore, in order to estimate the impact of fiscal policy variables on growth, this distinction has to be made. Benos (2009) and Arnold (2008), consider Government Budget Constraint models, however there are some limitations to the interpretations of results, since the specific changes on assets and liabilities should be accounted. A problem in growth models is that fiscal policy variables are likely endogenous, however, lagged values of fiscal variables are weak instruments even when applying Instrumental Variables or GMM. Consequently, this work will only able to establish conditional correlations among fiscal variables and growth. This study controls for the impact of variables that are relevant for the development of a locality. The robustness checks are added to the baseline specification.

## Regression equation

In this thesis in order to properly analyse fiscal variables, the estimation equation is as follows:

$$\Delta Y_{i,t} = \propto_i + \theta_1 Y_{i,t-1} + \beta_1 (R)_{i,t-1} + \beta_2 (E)_{i,t-1} + \theta_2 X_{it-1} + l_{i,t} + y_{i,t} + u_{i,t} \quad (2.53)$$

Where:

| | |
|---|---|
| i | = state |
| t | = time |
| $\propto_i$ | = Fixed effect for each locality i |

Y = GDP per capita level

R = Direct and indirect taxes and earmarked/non-earmarked transfers as a share of total revenue

E = Subsidies, transfers and aid, personal services and capital expenditure as a share of total expenditure

X = Control variables (Average School years of Education, Life Expectancy at birth, Average Population Growth)

lit = Locality fixed effects component

yit = Year fixed effects component

The main hypothesis is:

$$\Delta X_{it} = \text{f}(\text{R}_{it-1}, E_{it-1}, \text{X}_{it-1}) \quad (2.54)$$

The main income and expenditure components, should be considered when analysing the development of GDP per capita.

Additionally, this study will analyse employment and its correlation with transfers and taxes levied as follows:

$$L^E{}_{i,t} = \propto_i + \theta_1 Y_{i,t-1} + \beta_1 (R)_{i,t-1} + \beta_2 (E)_{i,t-1} + \theta_2 X_{it-1} + l_{i,t} + y_{i,t} + u_{i,t} \quad (2.55)$$

Where

$L^E$ = Rate of formal employment in locality i at time t

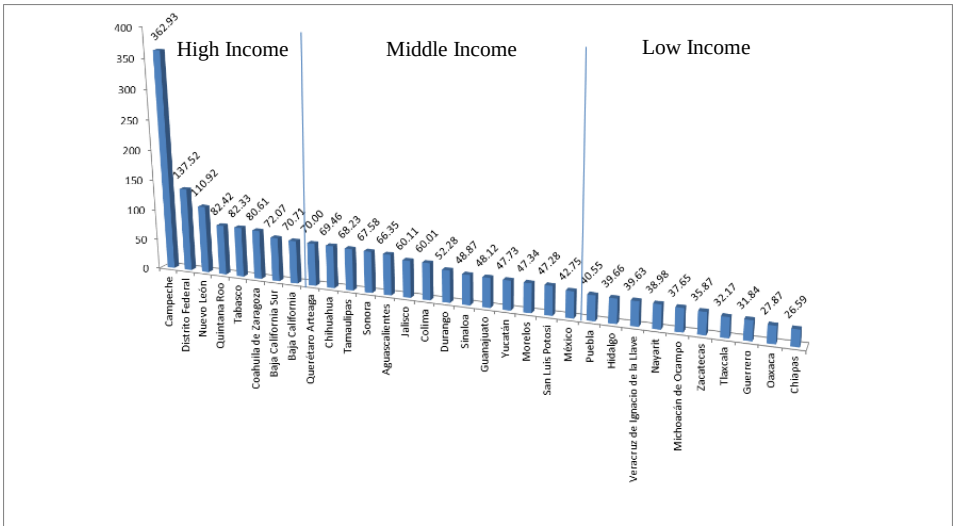
These models provide a clear setting of the type of analysis this research will develop in the following chapters. Specifically, the focus will be in identifying and comparing the particularities of states in Mexico. Understand the link between fiscal variables and their impact on GDP per capita and employment.

## Sources and properties of the data

In the case of Mexican States, they will be divided according to their average income between 1994 and 2010, since the income difference between the lowest and the highest is about 8 times. Maintaining in the same group states with similar GDP per capita provides us with a better tool of analysis, therefore, dummy variables per group will be considered for our fiscal variables. The analysis has been done with data of Mexico as a country without any group distinction and then considering state division by groups with my dummy variables.

**Graph 2.6 Mexican 32 Local States Average Income between 1994 and 2010**

(Thousands of pesos 2003 constant prices)




Source: Own calculations considering GDP provided by the Mexican National Statistics Institute

# Table 2.7 Descriptive statistics States

| Variable | Definition | Mean | Std. Dev. | CV | Source |
|---|---|---|---|---|---|
| **Dependent variables** | | | | | |
| **Employment rate** | Number of formally employed people as percentage of the population | 16.11 | 17.47 | 108.46 | Mexican Social Security Institute, IMSS (2012); author's calculations. |
| **Growth** | Annual real gross domestic product per capita growth in percentage | 2.18 | 5.92 | 271.84 | National Institute of Statics and Geography, INEGI (2012); author's calculations. |
| **Fiscal policy variables** | | | | | |
| **Capital expenditure** | Capital investment as a percentage of total expenditure | 0.10 | 0.06 | 59.53 | National Institute of Statics and Geography, INEGI (2012); author's calculations. |
| **Direct tax** | Direct taxes as a percentage of total goverment income | 0.02 | 0.03 | 145.01 | National Institute of Statics and Geography, INEGI (2012); author's calculations. |
| **Earmarked transfers** | Earmarked (conditional) transfers as a percentage of total government income | 0.46 | 0.16 | 35.48 | National Institute of Statics and Geography, INEGI (2012); author's calculations. |
| **Indirect tax** | Indirect taxes as a percentage of total government income | 0.00 | 0.01 | 118.02 | National Institute of Statics and Geography, INEGI (2012); author's calculations. |
| **Non-earmarked transfers** | Non-earmarked (unconditional) transfers as a percentage of total government income | 0.38 | 0.11 | 29.52 | National Institute of Statics and Geography, INEGI (2012); author's calculations. |
| **Personal services** | Personal services as a percentage of total government expenditure | 0.22 | 0.15 | 65.79 | National Institute of Statics and Geography, INEGI (2012); author's calculations. |
| **Subsidies, transfers and aid** | Subsidies, transfers and aid as a percentage of total government expenditure | 0.40 | 0.19 | 46.75 | National Institute of Statics and Geography, INEGI (2012); author's calculations. |
| **Control variables** | | | | | |
| **Average years of education** | Average years of schooling, in years | 7.62 | 1.05 | 13.78 | National Population Council, CONAPO (2012); author's calculations. |
| **Drainage and sewerage system** | Systems utilised for drainage and sewage, in thousands | 0.25 | 0.31 | 126.28 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **Electric energy users** | Users of electric energy, in millions | 0.80 | 0.64 | 80.86 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **Length of road network** | Real square meters constructed, in one hundred thousands | 0.09 | 0.06 | 64.67 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **Life expectancy** | Life expectancy at birth, in years | 73.88 | 1.25 | 1.69 | National Population Council, CONAPO (2012); author's calculations. |
| **New trucks sold** | New trucks sold to the public, in ten thousands | 0.88 | 1.16 | 131.75 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **Piped water systems** | Systems utilised for piped water, in ten thousands | 0.08 | 0.10 | 129.86 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **Population growth** | Annual percentage population growth rate | 1.36 | 1.00 | 73.58 | National Population Council, CONAPO (2012); author's calculations. |
| **Real GDP per capita** | Annual gross domestic product per capita level | 0.66 | 0.51 | 76.39 | National Institute of Statics and Geography, INEGI (2012); author's calculations. |
| **Total area sown** | Acres sown, in millions | 0.68 | 0.49 | 72.11 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |

## Table 2.8 Descriptive Statistics by Group of States

| | High Income | | | Middle Income | | | Low Income | | |
|---|---|---|---|---|---|---|---|---|---|
| Variable | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV |
| **Dependent variables** | | | | | | | | | |
| Employment rate | 19.26 | 6.66 | 34.58 | 21.47 | 23.76 | 110.66 | 6.08 | 2.07 | 34.10 |
| Growth | 0.98 | 5.03 | 514.22 | 2.43 | 5.85 | 240.44 | 2.77 | 6.55 | 236.27 |
| **Fiscal policy variables** | | | | | | | | | |
| Capital expenditure | 0.09 | 0.05 | 62.86 | 0.10 | 0.05 | 53.85 | 0.10 | 0.06 | 64.24 |
| Direct tax | 0.05 | 0.06 | 131.86 | 0.02 | 0.02 | 70.89 | 0.01 | 0.01 | 57.62 |
| Earmarked transfers | 0.37 | 0.16 | 44.19 | 0.46 | 0.14 | 29.94 | 0.53 | 0.16 | 30.30 |
| Indirect tax | 0.01 | 0.01 | 117.20 | 0.00 | 0.00 | 101.10 | 0.00 | 0.00 | 118.29 |
| Non-earmarked transfers | 0.38 | 0.10 | 25.28 | 0.40 | 0.10 | 26.01 | 0.36 | 0.13 | 36.53 |
| Personal services | 0.25 | 0.14 | 55.12 | 0.20 | 0.12 | 60.99 | 0.23 | 0.18 | 76.88 |
| Subsidies, transfers and aid | 0.33 | 0.17 | 52.68 | 0.43 | 0.16 | 37.46 | 0.40 | 0.21 | 52.60 |
| **Control variables** | | | | | | | | | |
| Average years of education | 8.42 | 0.93 | 11.06 | 7.80 | 0.75 | 9.63 | 6.73 | 0.84 | 12.52 |
| Drainage and sewerage system | 0.04 | 0.06 | 137.29 | 0.24 | 0.27 | 113.32 | 0.40 | 0.38 | 94.83 |
| Electric energy users | 0.78 | 0.77 | 99.53 | 0.82 | 0.66 | 80.55 | 0.78 | 0.49 | 63.24 |
| Length of road network | 0.06 | 0.03 | 47.04 | 0.10 | 0.07 | 67.86 | 0.11 | 0.06 | 53.78 |
| Life expectancy | 74.43 | 1.01 | 1.36 | 74.08 | 0.96 | 1.30 | 73.15 | 1.43 | 1.96 |
| New trucks sold | 1.26 | 1.84 | 145.96 | 0.89 | 0.90 | 100.59 | 0.55 | 0.49 | 88.49 |
| Piped water systems | 0.03 | 0.02 | 79.78 | 0.06 | 0.05 | 93.95 | 0.14 | 0.14 | 100.56 |
| Population growth | 2.09 | 1.38 | 66.22 | 1.35 | 0.58 | 43.18 | 0.78 | 0.65 | 84.14 |
| Real GDP per capita | 1.14 | 0.80 | 70.38 | 0.61 | 0.14 | 23.73 | 0.37 | 0.08 | 22.64 |
| Total area sown | 0.20 | 0.12 | 59.50 | 0.76 | 0.47 | 61.69 | 0.95 | 0.42 | 44.83 |

## Table 2.9 Descriptive Statistics by State

| | Baja California | | | Baja California Sur | | | Campeche | | | Coahuila | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | High income | | | High income | | | High income | | | High income | | |
| Variable | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV |
| **Dependent variables** | | | | | | | | | | | | |
| Employment rate | 0.13 | 5.43 | 4328.99 | 1.33 | 2.98 | 224.01 | -1.89 | 4.26 | -225.51 | 3.02 | 6.62 | 219.20 |
| Growth | 21.48 | 1.76 | 8.17 | 18.64 | 1.91 | 10.26 | 13.09 | 1.93 | 14.74 | 26.33 | 1.94 | 7.36 |
| **Fiscal policy variables** | | | | | | | | | | | | |
| Capital expenditure | 0.03 | 0.01 | 35.79 | 0.01 | 0.01 | 57.79 | 0.02 | 0.01 | 36.36 | 0.02 | 0.00 | 9.77 |
| Direct tax | 0.01 | 0.00 | 35.48 | 0.01 | 0.00 | 44.13 | 0.00 | 0.00 | 75.50 | 0.00 | 0.00 | 48.30 |
| Earmarked transfers | 0.32 | 0.08 | 24.64 | 0.35 | 0.03 | 9.17 | 0.34 | 0.02 | 6.19 | 0.36 | 0.04 | 11.74 |
| Indirect tax | 0.34 | 0.18 | 54.56 | 0.52 | 0.06 | 11.60 | 0.44 | 0.07 | 15.68 | 0.47 | 0.13 | 27.91 |
| Non-earmarked transfers | 0.33 | 0.16 | 48.99 | 0.58 | 0.05 | 8.97 | 0.23 | 0.06 | 25.93 | 0.20 | 0.13 | 66.37 |
| Personal services | 0.22 | 0.06 | 26.39 | 0.09 | 0.03 | 28.17 | 0.27 | 0.06 | 20.72 | 0.46 | 0.10 | 22.81 |
| Subsidies, transfers and aid | 0.06 | 0.03 | 45.71 | 0.06 | 0.04 | 66.84 | 0.09 | 0.05 | 48.01 | 0.12 | 0.05 | 38.66 |
| **Control variables** | | | | | | | | | | | | |
| Average years of education | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 |
| Drainage and sewerage system | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 |
| Electric energy users | 0.81 | 0.05 | 6.54 | 0.80 | 0.07 | 9.25 | 2.32 | 1.72 | 73.92 | 0.84 | 0.15 | 18.01 |
| Length of road network | 3.21 | 0.29 | 8.89 | 2.93 | 0.30 | 10.09 | 1.61 | 0.45 | 28.02 | 1.35 | 0.20 | 15.09 |
| Life expectancy | 75.09 | 0.64 | 0.86 | 74.73 | 0.88 | 1.18 | 73.55 | 1.14 | 1.55 | 74.16 | 0.48 | 0.65 |
| New trucks sold | 0.02 | 0.00 | 12.63 | 0.01 | 0.00 | 21.37 | 0.02 | 0.01 | 46.13 | 0.03 | 0.01 | 26.76 |
| Piped water systems | 0.79 | 0.17 | 21.43 | 0.15 | 0.05 | 30.91 | 0.17 | 0.04 | 26.37 | 0.65 | 0.15 | 22.74 |
| Population growth | 0.53 | 0.24 | 45.58 | 0.16 | 0.09 | 57.73 | 0.14 | 0.08 | 56.38 | 0.87 | 0.32 | 36.52 |
| Real GDP per capita | 0.02 | 0.01 | 38.12 | 0.01 | 0.00 | 13.45 | 0.03 | 0.01 | 19.72 | 0.00 | 0.00 | 27.89 |
| Total area sown | 0.23 | 0.01 | 4.96 | 0.04 | 0.01 | 16.75 | 0.21 | 0.02 | 8.30 | 0.29 | 0.03 | 8.79 |

## Table 2.10 Descriptive Statistics by State (Cont.)

| | Distrito Federal | | | Nuevo León | | | Quintana Roo | | | Tabasco | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | High income | | | High income | | | High income | | | High income | | |
| Variable | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV |
| **Dependent variables** | | | | | | | | | | | | |
| Employment rate | 1.12 | 4.67 | 417.80 | 2.90 | 6.00 | 207.07 | -0.75 | 4.86 | -645.71 | 1.86 | 2.96 | 159.06 |
| Growth | 25.97 | 1.67 | 6.44 | 23.73 | 1.41 | 5.95 | 18.77 | 1.45 | 7.71 | 6.11 | 0.88 | 14.42 |
| **Fiscal policy variables** | | | | | | | | | | | | |
| Capital expenditure | 0.20 | 0.02 | 9.75 | 0.05 | 0.01 | 18.09 | 0.03 | 0.00 | 13.50 | 0.01 | 0.00 | 20.56 |
| Direct tax | 0.01 | 0.01 | 69.74 | 0.00 | 0.00 | 52.56 | 0.02 | 0.01 | 50.75 | 0.00 | 0.00 | 61.13 |
| Earmarked transfers | 0.41 | 0.02 | 5.67 | 0.33 | 0.09 | 26.70 | 0.34 | 0.04 | 12.17 | 0.57 | 0.08 | 14.12 |
| Indirect tax | 0.09 | 0.07 | 75.93 | 0.33 | 0.10 | 30.62 | 0.43 | 0.11 | 26.70 | 0.36 | 0.10 | 26.98 |
| Non-earmarked transfers | 0.22 | 0.10 | 44.42 | 0.30 | 0.16 | 52.13 | 0.49 | 0.09 | 18.53 | 0.29 | 0.14 | 49.12 |
| Personal services | 0.30 | 0.09 | 28.52 | 0.24 | 0.09 | 35.12 | 0.09 | 0.01 | 14.68 | 0.29 | 0.14 | 47.46 |
| Subsidies, transfers and aid | 0.10 | 0.05 | 51.04 | 0.07 | 0.04 | 57.26 | 0.10 | 0.03 | 26.35 | 0.10 | 0.10 | 99.47 |
| **Control variables** | | | | | | | | | | | | |
| Average years of education | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 |
| Drainage and sewerage system | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 |
| Electric energy users | 1.56 | 0.11 | 7.22 | 1.16 | 0.23 | 19.68 | 0.99 | 0.05 | 4.81 | 0.63 | 0.31 | 48.59 |
| Length of road network | 0.25 | 0.15 | 59.42 | 1.64 | 0.28 | 16.94 | 4.63 | 0.74 | 16.02 | 1.07 | 0.60 | 56.02 |
| Life expectancy | 75.11 | 0.63 | 0.84 | 74.66 | 0.53 | 0.71 | 74.73 | 1.13 | 1.51 | 73.44 | 0.90 | 1.22 |
| New trucks sold | 0.00 | 0.00 | 0.00 | 0.04 | 0.01 | 18.77 | 0.01 | 0.00 | 43.14 | 0.16 | 0.05 | 30.24 |
| Piped water systems | 2.60 | 0.23 | 8.93 | 1.12 | 0.21 | 18.71 | 0.27 | 0.10 | 34.80 | 0.45 | 0.10 | 21.49 |
| Population growth | 5.45 | 1.86 | 34.18 | 1.91 | 0.88 | 46.26 | 0.41 | 0.27 | 66.56 | 0.56 | 0.34 | 60.83 |
| Real GDP per capita | 0.00 | 0.00 | 0.00 | 0.04 | 0.01 | 37.62 | 0.02 | 0.01 | 57.16 | 0.06 | 0.02 | 26.18 |
| Total area sown | 0.03 | 0.00 | 6.26 | 0.37 | 0.02 | 6.13 | 0.12 | 0.01 | 5.44 | 0.28 | 0.03 | 10.23 |

## Table 2.11 Descriptive Statistics by State (Cont.)

| | Aguascalientes | | | Colima | | | Chihuahua | | | Durango | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Middle income | | | Middle income | | | Middle income | | | Middle income | | |
| Variable | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV |
| **Dependent variables** | | | | | | | | | | | | |
| Employment rate | 2.47 | 4.29 | 173.63 | 2.21 | 6.08 | 275.11 | 0.88 | 6.11 | 694.30 | 2.79 | 6.11 | 219.34 |
| Growth | 17.68 | 0.78 | 4.39 | 89.19 | 3.96 | 4.44 | 2.54 | 0.26 | 10.26 | 11.36 | 0.40 | 3.52 |
| **Fiscal policy variables** | | | | | | | | | | | | |
| Capital expenditure | 0.01 | 0.01 | 79.22 | 0.01 | 0.01 | 89.18 | 0.04 | 0.01 | 14.82 | 0.01 | 0.00 | 36.06 |
| Direct tax | 0.00 | 0.00 | 28.99 | 0.00 | 0.00 | 42.84 | 0.01 | 0.00 | 33.33 | 0.01 | 0.00 | 30.53 |
| Earmarked transfers | 0.42 | 0.05 | 12.50 | 0.39 | 0.03 | 7.66 | 0.34 | 0.03 | 9.85 | 0.37 | 0.14 | 37.25 |
| Indirect tax | 0.50 | 0.05 | 10.90 | 0.50 | 0.08 | 15.20 | 0.43 | 0.06 | 13.81 | 0.51 | 0.20 | 40.19 |
| Non-earmarked transfers | 0.56 | 0.05 | 9.53 | 0.54 | 0.07 | 13.57 | 0.39 | 0.19 | 47.56 | 0.49 | 0.13 | 25.67 |
| Personal services | 0.08 | 0.01 | 15.51 | 0.13 | 0.02 | 14.65 | 0.24 | 0.17 | 70.81 | 0.19 | 0.07 | 35.13 |
| Subsidies, transfers and aid | 0.13 | 0.06 | 45.00 | 0.07 | 0.03 | 41.68 | 0.13 | 0.05 | 42.04 | 0.07 | 0.04 | 58.56 |
| **Control variables** | | | | | | | | | | | | |
| Average years of education | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 |
| Drainage and sewerage system | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 |
| Electric energy users | 0.71 | 0.10 | 13.50 | 0.65 | 0.08 | 11.67 | 0.78 | 0.07 | 9.07 | 0.55 | 0.10 | 17.62 |
| Length of road network | 2.07 | 0.37 | 17.71 | 1.56 | 0.19 | 12.04 | 1.38 | 0.32 | 23.36 | 0.61 | 0.17 | 28.12 |
| Life expectancy | 74.49 | 0.61 | 0.81 | 74.32 | 0.87 | 1.17 | 74.61 | 0.82 | 1.10 | 73.55 | 0.77 | 1.05 |
| New trucks sold | 0.30 | 0.03 | 11.68 | 0.07 | 0.01 | 12.14 | 0.21 | 0.06 | 26.41 | 0.89 | 0.27 | 30.30 |
| Piped water systems | 0.29 | 0.06 | 21.65 | 0.18 | 0.04 | 21.16 | 0.89 | 0.16 | 17.75 | 0.38 | 0.06 | 15.04 |
| Population growth | 0.36 | 0.15 | 43.38 | 0.20 | 0.11 | 54.11 | 0.88 | 0.34 | 38.08 | 0.26 | 0.10 | 39.31 |
| Real GDP per capita | 0.03 | 0.00 | 16.03 | 0.02 | 0.00 | 8.07 | 0.12 | 0.03 | 25.52 | 0.01 | 0.01 | 54.23 |
| Total area sown | 0.16 | 0.01 | 3.54 | 0.16 | 0.01 | 3.57 | 1.01 | 0.04 | 3.94 | 0.69 | 0.02 | 3.41 |

## Table 2.12 Descriptive Statistics by State (Cont.)

| | Guanajuato | | | Jalisco | | | México | | | Morelos | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Middle income | | | Middle income | | | Middle income | | | Middle income | | |
| Variable | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV |
| **Dependent variables** | | | | | | | | | | | | |
| Employment rate | 4.30 | 8.32 | 193.26 | 2.42 | 6.47 | 267.22 | 1.73 | 4.93 | 284.20 | 0.99 | 4.23 | 429.54 |
| Growth | 10.71 | 0.98 | 9.18 | 15.90 | 1.07 | 6.75 | 1.90 | 0.14 | 7.14 | 64.96 | 3.85 | 5.93 |
| **Fiscal policy variables** | | | | | | | | | | | | |
| Capital expenditure | 0.01 | 0.01 | 107.05 | 0.03 | 0.01 | 21.12 | 0.03 | 0.00 | 11.53 | 0.01 | 0.02 | 126.34 |
| Direct tax | 0.00 | 0.00 | 54.37 | 0.00 | 0.00 | 61.55 | 0.00 | 0.00 | 48.16 | 0.01 | 0.01 | 74.64 |
| Earmarked transfers | 0.41 | 0.06 | 13.48 | 0.40 | 0.10 | 23.82 | 0.41 | 0.05 | 13.32 | 0.41 | 0.10 | 23.70 |
| Indirect tax | 0.48 | 0.05 | 10.88 | 0.40 | 0.15 | 37.43 | 0.40 | 0.08 | 20.50 | 0.45 | 0.19 | 41.05 |
| Non-earmarked transfers | 0.29 | 0.17 | 59.00 | 0.22 | 0.13 | 61.13 | 0.30 | 0.15 | 50.86 | 0.49 | 0.16 | 32.08 |
| Personal services | 0.37 | 0.15 | 41.79 | 0.35 | 0.08 | 21.66 | 0.29 | 0.09 | 31.45 | 0.11 | 0.09 | 77.89 |
| Subsidies, transfers and aid | 0.08 | 0.03 | 43.30 | 0.05 | 0.02 | 40.94 | 0.09 | 0.03 | 36.39 | 0.11 | 0.04 | 31.75 |
| **Control variables** | | | | | | | | | | | | |
| Average years of education | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 |
| Drainage and sewerage system | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 |
| Electric energy users | 0.49 | 0.12 | 25.36 | 0.65 | 0.11 | 17.56 | 0.46 | 0.05 | 11.20 | 0.54 | 0.05 | 8.77 |
| Length of road network | 0.89 | 0.36 | 39.94 | 1.18 | 0.29 | 24.71 | 1.81 | 0.35 | 19.58 | 1.26 | 0.51 | 40.42 |
| Life expectancy | 73.96 | 1.09 | 1.47 | 74.25 | 0.80 | 1.08 | 74.33 | 1.03 | 1.38 | 74.44 | 1.10 | 1.48 |
| New trucks sold | 0.05 | 0.00 | 0.00 | 0.05 | 0.04 | 78.04 | 0.45 | 0.03 | 7.69 | 0.12 | 0.00 | 0.00 |
| Piped water systems | 1.24 | 0.25 | 19.75 | 1.73 | 0.39 | 22.34 | 2.60 | 0.27 | 10.57 | 0.46 | 0.09 | 19.74 |
| Population growth | 1.27 | 0.47 | 37.03 | 2.61 | 1.00 | 38.39 | 2.65 | 1.11 | 42.05 | 0.37 | 0.18 | 48.58 |
| Real GDP per capita | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 36.77 | 0.00 | 0.00 | 0.00 | 0.02 | 0.01 | 82.88 |
| Total area sown | 1.06 | 0.05 | 4.62 | 1.47 | 0.09 | 5.95 | 0.89 | 0.03 | 3.57 | 0.14 | 0.01 | 4.80 |

## Table 2.13 Descriptive Statistics by State (Cont.)

| | Querétaro | | | San Luis Potosí | | | Sinaloa | | | Sonora | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Middle income | | | Middle income | | | Middle income | | | Middle income | | |
| Variable | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV |
| **Dependent variables** | | | | | | | | | | | | |
| Employment rate | 2.99 | 5.04 | 168.56 | 3.31 | 7.47 | 225.61 | 2.67 | 6.20 | 232.35 | 2.07 | 4.19 | 202.00 |
| Growth | 16.95 | 1.32 | 7.82 | 10.15 | 1.02 | 10.02 | 12.24 | 1.12 | 9.12 | 16.63 | 0.90 | 5.42 |
| **Fiscal policy variables** | | | | | | | | | | | | |
| Capital expenditure | 0.01 | 0.02 | 116.68 | 0.01 | 0.01 | 69.26 | 0.01 | 0.00 | 15.88 | 0.03 | 0.01 | 26.93 |
| Direct tax | 0.01 | 0.00 | 50.43 | 0.00 | 0.00 | 95.18 | 0.00 | 0.00 | 30.89 | 0.01 | 0.00 | 45.69 |
| Earmarked transfers | 0.39 | 0.03 | 8.59 | 0.34 | 0.05 | 14.95 | 0.39 | 0.04 | 10.17 | 0.43 | 0.05 | 11.84 |
| Indirect tax | 0.49 | 0.08 | 15.87 | 0.58 | 0.04 | 6.46 | 0.46 | 0.13 | 28.52 | 0.41 | 0.04 | 9.09 |
| Non-earmarked transfers | 0.50 | 0.05 | 9.20 | 0.59 | 0.04 | 6.93 | 0.47 | 0.16 | 34.78 | 0.47 | 0.03 | 6.25 |
| Personal services | 0.12 | 0.02 | 14.64 | 0.13 | 0.03 | 24.44 | 0.16 | 0.03 | 17.50 | 0.20 | 0.03 | 16.78 |
| Subsidies, transfers and aid | 0.15 | 0.06 | 38.55 | 0.06 | 0.02 | 35.69 | 0.09 | 0.05 | 55.99 | 0.11 | 0.03 | 27.16 |
| **Control variables** | | | | | | | | | | | | |
| Average years of education | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 |
| Drainage and sewerage system | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 |
| Electric energy users | 0.73 | 0.13 | 17.75 | 0.47 | 0.10 | 21.24 | 0.51 | 0.10 | 18.82 | 0.71 | 0.09 | 12.03 |
| Length of road network | 2.24 | 0.36 | 15.92 | 0.84 | 0.30 | 35.95 | 0.58 | 0.41 | 72.12 | 1.36 | 0.33 | 23.91 |
| Life expectancy | 73.86 | 1.16 | 1.57 | 73.64 | 1.17 | 1.59 | 73.80 | 0.62 | 0.84 | 74.26 | 0.70 | 0.94 |
| New trucks sold | 0.15 | 0.09 | 59.96 | 0.27 | 0.12 | 46.43 | 0.25 | 0.08 | 32.55 | 0.22 | 0.11 | 49.85 |
| Piped water systems | 0.39 | 0.08 | 21.90 | 0.59 | 0.11 | 19.31 | 0.70 | 0.13 | 18.19 | 0.62 | 0.12 | 19.62 |
| Population growth | 0.39 | 0.27 | 68.50 | 0.48 | 0.23 | 47.04 | 0.84 | 0.46 | 55.00 | 0.68 | 0.29 | 43.39 |
| Real GDP per capita | 0.02 | 0.00 | 19.40 | 0.15 | 0.07 | 48.82 | 0.11 | 0.01 | 11.36 | 0.08 | 0.01 | 19.50 |
| Total area sown | 0.17 | 0.01 | 3.95 | 0.71 | 0.05 | 6.45 | 1.30 | 0.05 | 3.61 | 0.59 | 0.08 | 13.07 |

## Table 2.14 Descriptive Statistics by State (Cont.)

| | Tamaulipas | | | Yucatán | | | Chiapas | | | Guerrero | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Middle income | | | Middle income | | | Low income | | | Low income | | |
| Variable | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV |
| **Dependent variables** | | | | | | | | | | | | |
| Employment rate | 2.86 | 7.67 | 267.86 | 2.38 | 4.15 | 174.80 | 2.75 | 8.47 | 308.51 | 1.51 | 3.75 | 247.86 |
| Growth | 16.93 | 0.93 | 5.48 | 13.43 | 0.81 | 6.01 | 3.44 | 0.45 | 12.96 | 4.09 | 0.35 | 8.62 |
| **Fiscal policy variables** | | | | | | | | | | | | |
| Capital expenditure | 0.04 | 0.00 | 13.26 | 0.03 | 0.01 | 36.06 | 0.01 | 0.00 | 43.96 | 0.01 | 0.00 | 39.79 |
| Direct tax | 0.00 | 0.00 | 48.56 | 0.00 | 0.00 | 40.24 | 0.00 | 0.00 | 105.28 | 0.01 | 0.00 | 41.42 |
| Earmarked transfers | 0.35 | 0.04 | 11.67 | 0.57 | 0.24 | 43.28 | 0.35 | 0.04 | 11.67 | 0.29 | 0.11 | 38.98 |
| Indirect tax | 0.52 | 0.04 | 7.21 | 0.32 | 0.28 | 85.77 | 0.54 | 0.09 | 17.22 | 0.64 | 0.14 | 21.13 |
| Non-earmarked transfers | 0.49 | 0.06 | 12.65 | 0.27 | 0.10 | 36.63 | 0.32 | 0.19 | 59.30 | 0.51 | 0.18 | 34.83 |
| Personal services | 0.12 | 0.02 | 16.65 | 0.35 | 0.06 | 17.22 | 0.28 | 0.16 | 57.84 | 0.11 | 0.04 | 35.44 |
| Subsidies, transfers and aid | 0.19 | 0.05 | 29.14 | 0.08 | 0.04 | 52.64 | 0.11 | 0.03 | 24.81 | 0.10 | 0.05 | 47.81 |
| **Control variables** | | | | | | | | | | | | |
| Average years of education | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 |
| Drainage and sewerage system | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 |
| Electric energy users | 0.71 | 0.15 | 20.55 | 0.52 | 0.08 | 15.74 | 0.28 | 0.05 | 17.96 | 0.36 | 0.04 | 10.26 |
| Length of road network | 1.58 | 0.26 | 16.46 | 1.55 | 0.25 | 15.84 | 1.47 | 0.31 | 21.24 | 0.41 | 0.55 | 132.95 |
| Life expectancy | 74.07 | 0.74 | 1.00 | 73.57 | 1.20 | 1.63 | 72.13 | 1.55 | 2.15 | 72.05 | 1.15 | 1.60 |
| New trucks sold | 0.06 | 0.01 | 25.42 | 0.01 | 0.00 | 35.05 | 0.36 | 0.06 | 17.38 | 0.17 | 0.10 | 58.21 |
| Piped water systems | 0.91 | 0.17 | 18.79 | 0.50 | 0.08 | 15.59 | 0.93 | 0.44 | 47.18 | 0.69 | 0.14 | 20.97 |
| Population growth | 1.21 | 0.51 | 42.02 | 0.47 | 0.32 | 67.84 | 0.61 | 0.33 | 54.92 | 0.43 | 0.23 | 52.91 |
| Real GDP per capita | 0.06 | 0.04 | 62.99 | 0.06 | 0.01 | 13.49 | 0.31 | 0.11 | 36.21 | 0.15 | 0.03 | 20.43 |
| Total area sown | 1.49 | 0.09 | 5.77 | 0.77 | 0.04 | 5.02 | 1.48 | 0.10 | 6.74 | 0.81 | 0.05 | 5.93 |

## Table 2.15 Descriptive Statistics by State (Cont.)

| | Hidalgo | | | Michoacán | | | Nayarit | | | Oaxaca | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Low income | | | Low income | | | Low income | | | Low income | | |
| Variable | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV |
| **Dependent variables** | | | | | | | | | | | | |
| Employment rate | 2.75 | 8.17 | 297.25 | 4.22 | 9.11 | 215.53 | 2.59 | 6.93 | 267.24 | 2.05 | 4.69 | 228.63 |
| Growth | 6.33 | 0.38 | 5.99 | 3.79 | 0.31 | 8.17 | 9.29 | 1.16 | 12.48 | 4.05 | 0.34 | 8.28 |
| **Fiscal policy variables** | | | | | | | | | | | | |
| Capital expenditure | 0.01 | 0.00 | 34.73 | 0.01 | 0.01 | 96.40 | 0.01 | 0.00 | 25.69 | 0.00 | 0.00 | 55.62 |
| Direct tax | 0.01 | 0.00 | 26.91 | 0.00 | 0.00 | 54.78 | 0.01 | 0.00 | 21.97 | 0.00 | 0.00 | 110.94 |
| Earmarked transfers | 0.42 | 0.23 | 55.45 | 0.33 | 0.05 | 15.24 | 0.31 | 0.02 | 7.04 | 0.26 | 0.06 | 24.90 |
| Indirect tax | 0.49 | 0.24 | 48.26 | 0.59 | 0.03 | 5.45 | 0.54 | 0.14 | 26.01 | 0.56 | 0.22 | 38.52 |
| Non-earmarked transfers | 0.61 | 0.05 | 7.61 | 0.15 | 0.05 | 35.40 | 0.51 | 0.15 | 30.06 | 0.49 | 0.16 | 32.99 |
| Personal services | 0.05 | 0.02 | 27.95 | 0.53 | 0.07 | 12.23 | 0.11 | 0.02 | 13.62 | 0.08 | 0.02 | 22.49 |
| Subsidies, transfers and aid | 0.10 | 0.04 | 43.12 | 0.10 | 0.02 | 19.92 | 0.08 | 0.05 | 58.06 | 0.08 | 0.05 | 60.63 |
| **Control variables** | | | | | | | | | | | | |
| Average years of education | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 |
| Drainage and sewerage system | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 |
| Electric energy users | 0.39 | 0.08 | 19.76 | 0.38 | 0.09 | 25.03 | 0.42 | 0.08 | 19.85 | 0.30 | 0.04 | 14.63 |
| Length of road network | 0.91 | 0.37 | 40.81 | 0.12 | 0.49 | 407.06 | 0.57 | 0.28 | 48.54 | 0.42 | 0.45 | 107.85 |
| Life expectancy | 73.25 | 1.26 | 1.71 | 73.55 | 0.93 | 1.26 | 73.96 | 0.80 | 1.09 | 72.39 | 1.51 | 2.08 |
| New trucks sold | 0.16 | 0.20 | 127.13 | 0.00 | 0.01 | 184.46 | 0.07 | 0.01 | 18.89 | 0.25 | 0.07 | 25.70 |
| Piped water systems | 0.44 | 0.18 | 39.65 | 1.12 | 0.22 | 19.43 | 0.29 | 0.05 | 18.42 | 0.86 | 0.15 | 18.02 |
| Population growth | 0.36 | 0.17 | 48.32 | 0.90 | 0.35 | 38.67 | 0.15 | 0.06 | 39.04 | 0.46 | 0.28 | 60.61 |
| Real GDP per capita | 0.03 | 0.02 | 83.47 | 0.00 | 0.00 | 218.75 | 0.00 | 0.00 | 16.67 | 0.18 | 0.01 | 6.42 |
| Total area sown | 0.59 | 0.01 | 1.52 | 1.07 | 0.05 | 4.91 | 0.36 | 0.02 | 5.93 | 1.22 | 0.10 | 7.87 |

## Table 2.16 Descriptive Statistics by State (End)

| | Puebla | | | Tlaxcala | | | Veracruz | | | Zacatecas | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Low income | | | Low income | | | Low income | | | Low income | | |
| Variable | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV |
| **Dependent variables** | | | | | | | | | | | | |
| Employment rate | 2.42 | 5.70 | 235.30 | 2.26 | 6.91 | 305.95 | 3.16 | 6.16 | 195.07 | 3.99 | 4.71 | 118.07 |
| Growth | 7.51 | 0.32 | 4.28 | 6.80 | 0.62 | 9.19 | 7.96 | 0.65 | 8.19 | 7.52 | 1.06 | 14.10 |
| **Fiscal policy variables** | | | | | | | | | | | | |
| Capital expenditure | 0.02 | 0.00 | 22.70 | 0.01 | 0.00 | 21.69 | 0.01 | 0.01 | 82.45 | 0.01 | 0.00 | 52.11 |
| Direct tax | 0.00 | 0.00 | 52.74 | 0.00 | 0.00 | 56.01 | 0.00 | 0.00 | 21.12 | 0.00 | 0.00 | 25.19 |
| Earmarked transfers | 0.38 | 0.06 | 15.88 | 0.45 | 0.20 | 44.20 | 0.39 | 0.09 | 21.86 | 0.38 | 0.13 | 35.34 |
| Indirect tax | 0.51 | 0.06 | 12.07 | 0.40 | 0.24 | 59.82 | 0.51 | 0.06 | 11.06 | 0.55 | 0.15 | 27.88 |
| Non-earmarked transfers | 0.19 | 0.08 | 44.08 | 0.46 | 0.13 | 27.25 | 0.18 | 0.09 | 49.89 | 0.56 | 0.16 | 28.06 |
| Personal services | 0.37 | 0.09 | 24.89 | 0.18 | 0.10 | 56.52 | 0.45 | 0.07 | 14.92 | 0.15 | 0.10 | 66.44 |
| Subsidies, transfers and aid | 0.12 | 0.11 | 84.76 | 0.07 | 0.03 | 43.81 | 0.10 | 0.03 | 32.93 | 0.12 | 0.13 | 110.43 |
| **Control variables** | | | | | | | | | | | | |
| Average years of education | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 | 0.76 | 0.44 | 57.18 |
| Drainage and sewerage system | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 | 0.18 | 0.39 | 222.67 |
| Electric energy users | 0.44 | 0.06 | 14.64 | 0.35 | 0.05 | 14.70 | 0.41 | 0.08 | 19.74 | 0.35 | 0.08 | 23.79 |
| Length of road network | 1.37 | 0.27 | 19.75 | 1.77 | 0.33 | 18.61 | 0.55 | 0.25 | 45.92 | 0.18 | 0.23 | 129.71 |
| Life expectancy | 73.23 | 1.51 | 2.06 | 74.34 | 1.19 | 1.60 | 72.73 | 0.89 | 1.23 | 73.83 | 1.44 | 1.95 |
| New trucks sold | 0.95 | 0.41 | 43.15 | 0.23 | 0.01 | 2.45 | 0.57 | 0.32 | 56.70 | 0.73 | 0.33 | 44.61 |
| Piped water systems | 1.09 | 0.29 | 26.11 | 0.25 | 0.05 | 21.45 | 1.72 | 0.35 | 20.34 | 0.41 | 0.07 | 15.96 |
| Population growth | 1.11 | 0.46 | 41.11 | 0.13 | 0.05 | 34.87 | 1.24 | 0.61 | 48.89 | 0.16 | 0.06 | 39.61 |
| Real GDP per capita | 0.21 | 0.07 | 35.15 | 0.03 | 0.00 | 1.71 | 0.29 | 0.21 | 70.67 | 0.12 | 0.03 | 23.43 |
| Total area sown | 0.95 | 0.04 | 3.94 | 0.24 | 0.00 | 0.77 | 1.48 | 0.09 | 6.27 | 1.27 | 0.03 | 2.63 |

### 2.4.2 Growth

In this section, the proposed panel data model is applied to the 32 localities (31 states and the Federal District) in Mexico from 1994 to 2010, with the aim of determining the fiscal policy mix during the period of study and its impact on economic development. This empirical estimation analyses GDP per capita growth as a function of fiscal variables: government revenue and expenditure variables, considering average population growth, life expectancy at birth, average school years of education, the lagged value of GDP per capita and fiscal reform and recession dummies as control variables.

To begin my analysis, I regress growth per capita against income and expenditure variables considering Mexico as a whole (Table 2.20) and afterwards with group interactions of my fiscal variables of interest (Table 2.21). In both tables, the first column reports the fixed effects estimation, followed by the GMM system, as a matter of comparison with my baseline specification, robust standard errors for panel regressions with cross sectional dependence. I control for the impact of variables that are relevant for state development. The robustness checks are added to the baseline specification. My three methods of estimation present the same signs but my baseline specification has a higher F value, although the standard errors are similar among my three methods. The specification tests are included in Tables 2.17-2.19 which account for cross sectional dependence in the dataset, and most of my variables are stationary, although few control variables are non-stationary. My panel is unbalanced but none of the variables of my estimation present a problem of collinearity.

The coefficient of direct tax is not significant in Mexico as a whole (Table 2.20) or when considering direct tax intercept per group (Table 2.21). However, indirect tax coefficient shows a positive and significant relationship with growth in the case of Mexico as a country when controlling for infrastructure such as drainage and sewage systems, electric energy users, length of road network or total area sown. After considering group dummies (Table 2.21) indirect taxes

remain positive only in the case of the high-income group when controlling for drainage and sewage or piped water systems. In the former literature on taxation, Gemmell (2011 p.44) when comparing the long-term impact of fiscal variables on growth on 17 OECD countries from 1970 to 2004, find that distortionary taxation presents a negative sign considering that each country can take a different lag length up to 2. Dahlby et al. (2012 p.587) analyses the impact of tax changes on growth in Canadian provinces from 1997 to 2006 and finds out that there is a negative correlation with corporate taxation, however, personal income tax does not seem to affect growth. In Acosta-Ormaechea and Jiae Yoo study (2012) overall tax burden has a clear negative effect on growth, however they consider that there is a positive association of VAT with growth. In the case of Mexico in particular, several studies have found a negative relationship between taxes and growth [Srithongrung and Sánchez-Juárez (2015) and Caballero and López (2012)]. However, according to the study of Huang and Frentz (2014) there is no clear evidence that tax increases harm growth, particularly at a state level (p.8, 10), since every study refers to different entities with different socio-economic and political conditions, a diverse range of policies and time periods. Studies from Samaniego (2014), Bania et al. (2007) and Tomljanovich (2004) show even a positive effect of taxes on growth.

Mexican tax system contains structural weaknesses which limit its ability to generate revenue. Tax legislation is complex and provides preferential treatments currently quantifiable, in about half of the tax revenue. The use of the tax system to promote economic activities, or to subsidize the consumption or production of certain products or sectors, has shown its ineffectiveness at unsustainable fiscal cost. As a result, undesirable inequalities arise in the distribution of the tax burden, difficulties in tax compliance and administration, multiplicity of opportunities for evasion and circumvention of the tax burden and distortions in the decisions of investment, savings and consumption of economic agents (Jiménez et al., 2010).

According to the report Paying Taxes 2016 of the World Bank, which includes the study of the tax systems of 189 economies between 2004 and 2014, Mexico has a complex administrative burden and major challenges with the informal economy and tax evasion. INEGI reports that the informal economy accounted for around 26 percent of Mexico's GDP between 2000 and 2009. Therefore, in 2014 Mexico introduced an 'incorporation regime' as an attempt of the government to convince informal workforce to pay taxes in return for social security. Moreover, the main reason for the government to have implemented electronic invoicing in 2013 was to reduce tax evasion (World Bank, 2016).

Therefore, after reviewing the Mexican tax framework is not surprising that direct taxes do not seem to affect GDP per capita and only indirect taxes show a partial correlation in high income localities, because these type of taxes does not change the relative prices and are easier to administrate, control and collect.

The effect of non-earmarked transfers on growth, although expected to be positive, in the country as a whole have been found negative and significant (Table 2.20), nonetheless, when analysing them at a subnational level, they only remain negative and significant in the high-income localities but not significant in the other two groups (Table 2.21). Perhaps, these results would imply that this kind of resources may be canalised to current spending instead of applying them on productive activities. Non-earmarked transfers can be used for any purpose that the local governments consider as important according to their local priorities since they are unconditional transfers, in fact, according to the study of Garcia (2010 p.239, 248) non-earmarked transfers show a positive relationship with growth considering average data from 1997 to 2005 for Mexican States, however, a negative association is found between earmarked transfers and growth. Considering earmarked transfers, their effect on growth in Mexico at a country level, turns to be negative and significant. The negative effect could be result of the lack of capability of managing resources or a deficient institutional framework, as explained by Fatás and Mihov (2003) where political and institutional environment can moderate effects of fiscal policy. According to

Transparency International (2014) Mexico is ranked 103 among 175 countries in the corruption index, and as I will discuss in chapter five, people do not trust their local authorities because they perceive high levels of corruption, lack of transparency and accountability of resources. Unfortunately, I was unable to find indicators for corruption at a local level in Mexico.

## Table 2.17 Cross Sectional Dependence and Heteroskesdasticity Tests

| Test | Value | p-value |
|---|---|---|
| Pesaran's | -2.96 | 0.00 |
| Mod. Wald test | 225.15 | 0.00 |

## Table 2.18 Fisher Unit Root Test

| Unit Root Test | t-statistics | p-value |
|---|---|---|
| Growth | 404.07 | 0.00 |
| Direct tax | 85.67 | 0.04 |
| Indirect tax | 217.36 | 0.00 |
| Non-earmarked transfers | 140.11 | 0.00 |
| Earmarked transfers | 549.77 | 0.00 |
| Subsidies, transfers and aid | 213.48 | 0.00 |
| Personal services | 263.34 | 0.00 |
| Capital expenditure | 171.22 | 0.00 |
| Fiscal reform | 67.81 | 0.35 |
| Recession dummy | 5.45 | 1.00 |
| Real GDP per capita | 86.43 | 0.03 |
| Average years of education | 83.41 | 0.05 |
| Population growth | 347.50 | 0.00 |
| Life expectancy | 81.19 | 0.07 |
| Drainage and sewerage system in thousands | 97.45 | 0.00 |
| Electric energy users in millions | 27.35 | 1.00 |
| New trucks sold in ten thousands | 30.41 | 1.00 |
| Piped water systems in ten thousands | 159.05 | 0.00 |
| Length of road network in one hundred thousan | 125.78 | 0.00 |
| Total area sown in millions | 147.94 | 0.00 |

## Table 2.19 Collinearity Test

| | Collinearity statistics | |
|---|---|---|
| VARIABLES | Tolerance | VIF |
| Direct tax | 0.36 | 2.75 |
| Indirect tax | 0.52 | 1.93 |
| Non-earmarked transfers | 0.33 | 3.06 |
| Earmarked transfers | 0.22 | 4.53 |
| Subsidies, transfers and aid | 0.16 | 6.17 |
| Personal services | 0.18 | 5.69 |
| Capital expenditure | 0.67 | 1.50 |
| Real GDP per capita | 0.61 | 1.63 |
| Average years of education | 0.13 | 7.45 |
| Population growth | 0.41 | 2.45 |
| Life expectancy | 0.13 | 7.65 |
| Drainage and sewerage system in thousands | 0.60 | 1.66 |
| Electric energy users in millions | 0.16 | 6.28 |
| New trucks sold in ten thousands | 0.19 | 5.30 |
| Piped water systems in ten thousands | 0.37 | 2.72 |
| Length of road network in one hundred thousands | 0.38 | 2.66 |
| Total area sown in millions | 0.19 | 5.35 |

## Table 2.20 Pooled Growth Regression across Mexican States 1994-2010

| | Obs. | Fixed effects | GMM | Baseline specification | Drainage and sewerage systems added | Electric energy users added | New trucks sold to the public added | Piped water systems added | Length of the road network added | Total area sown added |
|---|---|---|---|---|---|---|---|---|---|---|
| **VARIABLES** | | | | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| **Fiscal policy variables** | | | | | | | | | | |
| **Revenue** | | | | | | | | | | |
| Direct tax | 542 | -23.35 | -13.57 | -23.35 | 22.85 | 24.41 | 16.72 | 14.80 | 46.81 | 42.71 |
| | | (24.42) | (9.94) | (19.02) | (42.33) | (42.21) | (44.84) | (51.38) | (39.74) | (38.42) |
| Indirect tax | 448 | 49.43 | -89.39* | 49.43 | 82.76* | 84.77* | 81.59 | 84.46 | 104.07** | 100.70* |
| | | (45.37) | (45.79) | (67.88) | (45.33) | (46.03) | (47.39) | (48.54) | (44.47) | (47.35) |
| Non-earmarked transfers | 512 | -2.17 | -5.83** | -2.17 | -5.83*** | -5.76*** | -5.53*** | -5.58*** | -3.65* | -3.30* |
| | | (3.13) | (2.79) | (1.89) | (1.79) | (1.89) | (1.83) | (1.77) | (1.97) | (1.78) |
| Earmarked transfers | 512 | -3.30 | -6.55** | -3.30 | -4.07 | -3.83 | -3.71 | -4.42 | -1.55 | -1.42 |
| | | (2.30) | (2.83) | (2.89) | (2.85) | (2.92) | (2.85) | (2.73) | (2.96) | (3.07) |
| **Expenditure** | | | | | | | | | | |
| Subsidies, transfers and aid | 512 | 3.90 | 6.69*** | 3.90 | 6.59*** | 6.62*** | 6.55*** | 7.23*** | 8.02*** | 8.25*** |
| | | (2.58) | (2.50) | (3.33) | (2.10) | (2.01) | (2.01) | (2.13) | (2.46) | (2.59) |
| Personal services | 512 | 0.99 | 7.01** | 0.99 | 3.56 | 3.56 | 3.28 | 4.42 | 5.51 | 5.51 |
| | | (3.49) | (2.80) | (5.24) | (2.88) | (2.93) | (2.83) | (2.78) | (3.72) | (3.85) |
| Capital expenditure | 512 | -3.88 | -2.13 | -3.88 | -0.16 | -0.20 | -0.40 | 0.10 | 1.29 | 1.87 |
| | | (3.46) | (4.00) | (5.36) | (3.64) | (3.52) | (3.33) | (3.22) | (2.84) | (2.75) |
| **Control variables** | | | | | | | | | | |
| Fiscal reform | 544 | -8.07** | -1.67 | -1.28*** | -9.38*** | -20.52 | -8.73** | -22.58 | -0.84** | -0.82** |
| | | (3.59) | (26.83) | (0.27) | (3.05) | (57.86) | (3.12) | (60.02) | (0.33) | (0.34) |
| Recession dummy | 544 | 0.46 | -1.46 | -6.32** | -1.72*** | -9.26** | -1.79*** | -9.60** | -6.94** | -8.26*** |
| | | (0.88) | (0.94) | (2.73) | (0.30) | (3.86) | (0.33) | (3.42) | (3.09) | (2.15) |
| Real GDP per capita | 544 | -2.02*** | -1.56*** | -2.02*** | -2.07*** | -2.07*** | -2.18*** | -2.23*** | -2.26*** | -2.26*** |
| | | (0.31) | (0.40) | (0.45) | (0.42) | (0.42) | (0.43) | (0.44) | (0.46) | (0.47) |
| Average years of education | 512 | 4.30 | 0.12 | 4.30** | 5.39** | 5.54** | 6.09** | 5.94* | 4.39 | 4.51* |
| | | (3.02) | (0.39) | (1.58) | (2.27) | (2.44) | (2.74) | (3.06) | (2.56) | (2.52) |
| Population growth | 512 | -1.43** | -0.53* | -1.43 | -1.97 | -2.01 | -2.17 | -2.21 | -2.20* | -2.09* |
| | | (0.69) | (0.27) | (1.15) | (1.20) | (1.31) | (1.26) | (1.28) | (1.20) | (1.17) |
| Life expectancy | 512 | 0.24 | 0.09 | 0.24 | -0.15 | -0.13 | -0.28 | -0.14 | -0.23 | 0.05 |
| | | (0.41) | (0.38) | (0.47) | (0.64) | (0.65) | (0.64) | (0.69) | (0.52) | (0.55) |
| Drainage and sewerage system in thousands | 363 | | | | 1.46* | 1.49** | 1.96** | 1.44 | 1.04 | 0.74 |
| | | | | | (0.70) | (0.65) | (0.73) | (1.00) | (0.94) | (1.00) |
| Electric energy users in millions | 510 | | | | | 0.09 | 1.29 | 1.18 | 1.54 | 1.29 |
| | | | | | | (1.52) | (1.32) | (1.87) | (1.59) | (1.73) |
| New trucks sold in ten thousands | 505 | | | | | | -2.22* | -2.15 | -2.46 | -2.34 |
| | | | | | | | (1.05) | (1.32) | (1.41) | (1.48) |
| Piped water systems in ten thousands | 393 | | | | | | | 0.83 | 3.43 | 3.44 |
| | | | | | | | | (5.56) | (4.68) | (5.04) |
| Length of road network in one hundred thousa | 505 | | | | | | | | -9.98 | -10.98 |
| | | | | | | | | | (8.11) | (8.45) |
| Total area sown in millions | 393 | | | | | | | | | -5.03 |
| | | | | | | | | | | (3.64) |
| Observations | | 510 | 510 | 510 | 361 | 359 | 357 | 336 | 330 | 329 |
| Number of states | | 32 | 32 | 32 | 31 | 31 | 30 | 29 | 29 | 29 |
| F - statistic | | 101.4*** | 37.23*** | 46748*** | 41700*** | 14313*** | 141.5*** | 3859*** | 758.5*** | 462.8*** |
| R - squared | | 0.624 | --- | 0.624 | 0.605 | 0.602 | 0.607 | 0.595 | 0.649 | 0.651 |

Notes: Dependent variable is real GDP per capita annual percentage growth rate. Independent variables have one period lagged values. Annual data for 1994-2010. All regressions also contain year dummies and a constant term. SE are reported in parentheses. The estimators used are fixed effects, system GMM and the Discroll and Kraay (1998) that accounts for autocorrelation, heteroskedasticity and cross sectional dependence. Fisher Unit Root Test was conducted to all regression variables and accepting in most of them the alternative hypothesis of at least one Panel being stationary at a 10% level. ***(**/*) denotes statistically significant at the 1%(5%/10%) level.

# Table 2.21 Growth Regression with State Group Interactions

| | Fixed Effects | GMM | Baseline specification | Drainage and sewerage systems added | Electric energy users added | New trucks sold to the public added | Piped water systems added | Length of the road network added | Total area sown added |
|---|---|---|---|---|---|---|---|---|---|
| **VARIABLES** | | | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| **Fiscal policy variables** | | | | | | | | | |
| Indirect tax, High income | 122.54 | -79.04 | 122.54 | 183.39** | 124.00 | 118.72 | 171.56** | 162.28 | 122.25 |
| | (81.60) | (63.85) | (97.51) | (72.24) | (96.42) | (100.11) | (72.65) | (102.77) | (97.72) |
| Indirect tax, Middle income | -16.19 | -99.59 | -16.19 | -39.16 | -15.20 | -0.08 | -133.79 | 3.34 | -11.87 |
| | (104.63) | (84.35) | (82.52) | (173.14) | (82.87) | (81.66) | (120.76) | (77.14) | (85.56) |
| Indirect tax, Low income | 125.32 | -34.34 | 125.32 | 43.47 | 128.39 | 115.48 | -9.73 | 96.43 | 131.25 |
| | (179.05) | (94.67) | (115.78) | (96.31) | (104.24) | (116.42) | (174.85) | (123.99) | (127.68) |
| Subsidies, transfers and aid, High inc | -5.78* | 2.49 | -5.78 | -7.70 | -5.75 | -5.41 | -6.64* | -5.35 | -5.83 |
| | (3.47) | (2.65) | (5.09) | (4.49) | (4.79) | (5.27) | (3.36) | (6.07) | (5.10) |
| Subsidies, transfers and aid, Middle | 4.02 | 8.07*** | 4.02** | 4.42* | 4.21** | 4.26** | 4.21* | 3.52* | 5.70*** |
| | (3.53) | (2.34) | (1.55) | (2.43) | (1.89) | (1.68) | (2.35) | (1.68) | (1.75) |
| Subsidies, transfers and aid, Low inc | 6.29* | 3.12 | 6.29*** | 7.60*** | 6.40*** | 6.09*** | 7.61*** | 6.71*** | 6.73*** |
| | (3.34) | (1.93) | (0.94) | (1.25) | (0.96) | (0.84) | (1.64) | (1.07) | (0.94) |
| Personal services, High income | -10.99** | 8.19*** | -10.99* | -9.38 | -10.88* | -11.43* | -9.23* | -10.83 | -11.15* |
| | (5.07) | (3.04) | (5.66) | (7.24) | (5.56) | (5.70) | (4.38) | (6.41) | (5.60) |
| Personal services, Middle income | 4.78 | 7.50** | 4.78* | 2.01 | 4.95* | 5.35* | 1.84 | 2.68 | 6.30** |
| | (4.83) | (3.39) | (2.51) | (3.72) | (2.37) | (2.76) | (4.25) | (3.68) | (2.85) |
| Personal services, Low income | 5.23 | 3.71 | 5.23 | 5.91 | 5.35 | 5.23 | 6.66 | 5.69 | 5.44 |
| | (5.02) | (2.51) | (3.59) | (4.13) | (4.00) | (3.60) | (3.85) | (3.75) | (3.51) |
| Capital expenditure, High income | -14.07* | 15.73* | -14.07** | -16.18* | -13.94** | -15.04** | -14.89** | -15.81** | -13.79** |
| | (7.27) | (9.01) | (5.79) | (8.70) | (5.65) | (5.42) | (6.42) | (6.97) | (5.73) |
| Capital expenditure, Middle income | -2.51 | -4.42 | -2.51 | -2.24 | -2.69 | -2.88 | -0.61 | -0.09 | -1.80 |
| | (7.27) | (8.14) | (5.51) | (7.63) | (5.72) | (5.52) | (6.30) | (5.04) | (5.83) |
| Capital expenditure, Low income | -1.18 | 17.45* | -1.18 | 1.23 | -1.21 | -1.22 | -0.36 | -1.17 | -0.25 |
| | (5.49) | (9.79) | (4.36) | (3.99) | (4.40) | (4.37) | (4.58) | (4.46) | (3.97) |
| **Control variables** | | | | | | | | | |
| Fiscal reform | 20.19*** | -0.03 | 5.22** | 7.27*** | 7.07** | 7.17*** | 5.38*** | 6.73*** | 11.99*** |
| | (1.19) | (1.06) | (1.79) | (1.09) | (2.96) | (2.18) | (1.24) | (0.83) | (3.00) |
| Recession dummy | -14.51*** | 2.06** | 1.97*** | -2.77*** | -11.00*** | -3.34*** | -8.99*** | -8.57*** | -0.22 |
| | (1.07) | (0.94) | (0.06) | (0.08) | (0.46) | (0.81) | (0.12) | (0.16) | (0.62) |
| Real GDP per capita | -1.76*** | -1.75*** | -1.76*** | -1.67*** | -1.75*** | -1.78*** | -1.74*** | -1.70*** | -1.75*** |
| | (0.62) | (0.45) | (0.48) | (0.54) | (0.50) | (0.49) | (0.49) | (0.49) | (0.50) |
| Population growth | -2.42** | -0.12 | -2.42** | -3.07*** | -2.48** | -2.31** | -3.39*** | -2.53** | -2.62*** |
| | (1.12) | (0.29) | (0.90) | (0.95) | (0.87) | (0.97) | (1.08) | (1.07) | (0.89) |
| Drainage and sewerage system | | | | 0.98 | | | | | |
| | | | | (0.67) | | | | | |
| Electric energy users | | | | | 0.24 | | | | |
| | | | | | (1.59) | | | | |
| New trucks sold | | | | | | -0.31 | | | |
| | | | | | | (0.42) | | | |
| Piped water systems | | | | | | | 0.21 | | |
| | | | | | | | (3.65) | | |
| Length of road network | | | | | | | | -3.58 | |
| | | | | | | | | (10.94) | |
| Total area sown | | | | | | | | | -7.34** |
| | | | | | | | | | (2.70) |
| Observations | 510 | 542 | 510 | 361 | 508 | 503 | 391 | 492 | 509 |
| Number of states | 32 | 32 | 32 | 31 | 32 | 32 | 31 | 32 | 32 |
| F - statistic | 26.25*** | 34.10*** | 1.856e+06*** | 54.72*** | 121.2*** | 6971*** | 145.7*** | 252.9*** | 141.5*** |
| R - squared | 0.629 | --- | 0.629 | 0.606 | 0.627 | 0.629 | 0.626 | 0.657 | 0.632 |

Notes: Dependent variable is real GDP per capita annual percentage growth rate. Independent variables have one period lagged values. Annual data for 1994-2010. All regressions also contain year dummies and a constant term. SE are reported in parentheses. The estimators used are fixed effects, system GMM and the Discroll and Kraay (1998) that accounts for autocorrelation, heteroskedasticity and cross sectional dependence. Fisher Unit Root Test was conducted to all regression variables and accepting in most of them the alternative hypothesis of at least one Panel being stationary at a 10% level. ***(**/*) denotes statistically significant at the 1%(5%/10%) level.

Only resources that are properly monitored and have a specific destination might promote growth within a particular time period. In this respect, it is important to consider the 2014 Report of the Chief Audit Office in Mexico, where the earmarked transfers can be subject to revision (63.2 per cent of total transfers on 2012) which states that the use of those resources has not been transparent and responsible as it should be according to the federal law, where specific legislation needs to be promoted to guarantee the proper use of resources. As an excuse, due to the fragility of local finances, local authorities use earmarked federal transfers for other purposes, instead of using them on what they should according to the law. Regrettably, considering the autonomy of the local authorities, the Chief Audit Office can only recommend the appropriate use of federal resources but no sanction is imposed on the local authorities that do not comply with the law. The major risk is derived from the fact that local audit institutions are not independent from the local governments. Non-earmarked transfers cannot be audited by the federal government since those resources can be freely managed and applied by the local government, which also can constitute a risk for the proper use of resources. Furthermore, Caldera Sanchez, A. (2013, p.29) indicates that for the period 1989-2010 the correlation coefficient between sub-central tax and transfer revenues in Mexican States is 0.38, indicating the destabilising effects of transfers. Moreover, when including state and year effects, results suggests that the transfer system is highly pro-cyclical and GDP shocks are likely to affect own tax income.

The coefficient of earmarked transfers is not significant which could be explained by a lack of transparency in the use of its funds. For instance, the fund provided for education was distributed according to the number of schools and teachers, therefore it followed an inertial tendency without considering efficiency or inequality characteristics of each locality. Similarly, the health fund was canalised according to medical infrastructure and doctors, which again failed to ponder State health needs (Aguilera and Barraza, 2009). The infrastructure fund does benefit the localities which present lower development, however, security funds are assigned according to delinquency index, which is a clear disincentive to decrease the levels of criminality.

My results for country and state level in Mexico demonstrate a positive relationship between subsidies, transfers and aid, on the one hand, and GDP per capita growth, on the other. This is consistent with the redistribution argument among unequal entities, welfare state, collective goods, social peace and democracy (Lindert, 2004). Social expenditure in Mexico increased about 2 percent of GDP from 1985 to 2009, which represents about one third of OECD average. Social transfers represent only about 8 percent of household disposable income and overall, this expenditure is not properly focused because half of cash transfers benefit the upper segment of the income ladder and just 10 percent of the funds is given to the poorest 20 percent (OCDE, 2012). Moreover, subsidies, transfers and aid should be provided exclusively to beneficiaries and public-sector institutions involved. These resources should be clearly identified, monitored and controlled according to fiscal regulations. In OCDE report (2012) in order to significantly reduce poverty, it would be necessary to increase social transfers to the poor, which means reforming the social security system to provide more efficient support to lower-income families. Subsidies, transfers and aid represent mechanisms through which governments foster economic growth and the redistribution of income by promoting investment or employment in certain vulnerable sectors (i.e. agriculture).

Regarding, personal services coefficient, it has a positive relationship with growth in the middle and low-income group, result that is consistent with Devarajan (1996) who finds a surprising result; current expenditures in developing countries boost economic activity more than capital expenditures. As discussed earlier in the chapter, personal services represent about 80 percent of current expenditure in states, so its role is significant in order to maintain employment demand in the local governments by providing families with income that can further be spent on goods and services in the local economies. This could be explained by the crowding-in effect that occurs when the government injects spending into the economy by the payment of wages to the bureaucrats, creating consumption demand and positive multiplier effects through bureaucrats' spending on goods and services (NEF, 2012). Thus, the benefits

and costs of state development policies might be different among different regions and positive in areas of high unemployment and were programs are perceived to have an impact on businesses and economic activity (Bartik, 1991).

The effect of government investment on growth in Mexico at a country level is not significant and negative for high income states (Table 2.20). According to Lachler and Aschauer (1998, p.1) an increase in public investment can have a positive impact on growth if attention is focused on quality of public spending, rate of return of the investments and complementarity with private investment. Public infrastructure can promote economic development by increasing the productivity of priority sectors or by reducing factor costs. In other words, enhancing the efficiency of private inputs employed by firms or by providing an attractive environment to families so they are able to accept lower wages (Eberts, 1990). Government investment can have a significant effect on GDP per capita for middle income regions but not for low income states; conversely, social capital has the opposite effect (Looney et al., 1981). Overall the regional effect would depend on the locational advantages, production efficiency, costs and misallocations of public spending (Devarajan, 1996). My results are consistent with Devarajan's who states that capital expenditure effect on growth can be negative in developed economies. Moreover, in my case, since regional inequalities are huge in Mexican localities, the effects of public investment in the country might be offsetting between different regions. Unfortunately, another limitation for the current analysis is that no information of local private investment was available for my period of study. In this respect, Ebert´s (1986) findings -when analysing 38 metropolitan areas in the US from 1958 until 1978 - show that the marginal product of public capital can be around seven times lower than the private capital.

Gemmell et al. (2013, p.1928) analyses the development of fiscal decentralization in OECD countries from 1972 to 2005 finding a negative effect of expenditure decentralization, which could mean that federal government is more efficient in allocating expenditure to productive and national priority areas, and a positive revenue decentralization effect, perhaps because local authorities

collect less distortionary taxes than the federal government. However, it is important to consider that in their sample, all the countries have spending shares higher than those of revenue shares with the exception of Mexico. Kappeler et al. (2012) analyse 20 European countries from 1990-2009, where local infrastructure increases with revenue decentralization, however, the effect is lower if earmarked grants are canalized to capital investment. Besides, public investment of three levels of government provide infrastructure for roads, bridges, public services and priority areas and can in fact play an important role during downturns and promote productivity growth in the long run, where the estimated returns of public investment on private sector productivity ranges between 15 and 45 percent (Bivens, 2012, p.1-2). According to Amieva-Huerta (2010, p.252-256) current public spending could be positively related to GDP per capita, which means that current public spending is not counter-cyclical and it is highly inelastic due to the institutional committed expenditures of the public sector. Moreover, his analysis rejects Barro's neutrality hypothesis where fiscal policy affects private savings. His findings demonstrate that public current savings have a positive effect on private savings which means an interesting result: "public investment complements private investment".

In my study, I want to evaluate the impact on GDP per capita of 1998 Federal Reform to the Fiscal Coordination System, therefore I included in my estimation a fiscal reform dummy, due to the limitation of data on the legal institutional framework. This reform refers to earmarked transfer funds to local governments, mainly for education, health and infrastructure as explained in section 2.1.3. Although I had expected a positive relationship with growth, considering the aforementioned analysis of transfers, the fiscal dummy variable turns out to be negative in the country as a whole, but positive when considering the different levels of development of states. This result is consistent with Andrew's (2013) findings regarding institutional reforms that have failed to take into account the context in which they are implemented. Additionally, in order to control for the 2008 financial crisis, I included a recession dummy that as expected, had a negative impact on growth.

Turning to other regressors, higher levels of education reflect higher growth, which is consistent with Bassanini et al.'s (2001, p.42-43) findings. Moreover, according to the work developed by Gemmell et al. (2009), there is a strong positive association between education and growth Barrios (2009). Population and Life Expectancy did not present significant coefficients. However, the effect of population growth on GDP per capita in developing economies is not clear and no consensus has been reached about it (Wong Hock and Fumitaka, 2006, p.314). Acemoglu (2006, p.1) finds there is no clear evidence of a significant increase in growth due to higher life expectancy. My main results hold when I add robustness checks to the baseline specification.

### 2.4.3 Employment

In this section, my proposed panel data model is applied to the 32 localities (31 states and the Federal District) in Mexico from 1994 to 2010, with the aim of determining the fiscal policy mix during the period of study and its impact on employment. This empirical estimation analyses formal employment rate as a function of fiscal variables: direct taxes, indirect taxes, federal transfers and capital expenditure, considering average population growth, average school years of education, the lagged value of GDP per capita and fiscal reform and recession dummies as control variables.

I apply a fixed effects panel data model and system GMM in order to compare them with my baseline specification model that allows for cross sectional dependence in my dataset. The Stata command "xtscc" is used (Hoechle 2007). The specification tests are prior to the regression tables. The procedure followed is similar to the developed in the previous section.

To begin my analysis, I regress the equation proposed on my model which links formal employment rate with my fiscal variables considering Mexico as a whole (Table 2.25) and afterwards with group interactions (Table 2.26). In both tables, the first column reports the fixed effects regression, afterwards the system GMM and finally the baseline specification estimation, robust standard errors for panel regressions with cross sectional dependence. My three methods of estimation provide the same sign effect of fiscal variables on employment, however, GMM provides better results but is not robust according to Sargan's test. The specification tests for cross sectional dependence, heteroskedasticity and collinearity are reported in Tables 2.22-2.24.

According to my study, direct taxes have a negative and significant effect on employment rate in Mexico as a country (Table 2.25) and the middle-income group (Table 2.26). In fact, Mark et al. (2000, p.105), estimate determinants of employment in Washington D.C. metropolitan area over from 1969-1994 and their results demonstrate that taxes have a significant negative effect on

employment. A high number of workers in a state is paid by the government, for instance teachers, public health and social security workers, among others, therefore, Freeman R. (1987, p.183-184) determines that at a local level, public sector employment increases during recessions and decreases during expansions, while public payroll moves in the opposite direction. However, indirect taxes for the low-income states show a positive sign, perhaps because this type of taxes are regressive and the income effect is greater than the substitution effect and agents are poorer with an increase of the tax burden and have to work more in order to keep their level of consumption.

Regarding non-earmarked transfers, I find a positive and significant association with employment when considering group intercepts in low income groups but no relationship in the other income groups (Table 2.26). This outcome might be the result of fragile institutional accountability and transparency as described in the earlier section. According to the study developed by the US Advisory Commission on Intergovernmental Relations, and United States of America (1977, p.56) grants can influence public employment. This situation could be the result of higher employability on a particular sector that is being stimulated by a particular grant, or even indirectly affected by the complementarity of certain good or service linked to the activity promoted. Furthermore, higher employment could be attained derived only by the income effect since the localities have more resources to spend on a particular activity. Dahlberg et al. (2008, p.30-31) demonstrate that there is a large and positive effect of transfers on the number of employees in the central administration, but no effects in other sectors. Additionally, Mitze (2010, p.1) finds that state to state transfers have a negative effect on growth while federal to state transfers show a positive relationship on public investment and growth.

Fatás and Ilian (2001, p.5-8) suggest that government spending has a positive effect on employment because when government increases expenditure it boosts economic activity. They prove that government spending is expansionary with a multiplier larger than one. Concerning capital expenditure, I find a negative relationship in low income and high-income groups (Table 2.26). In this respect,

it might be, as mentioned in the previous section, that capital misallocations, informal economy and inefficiencies in public spending do not reflect in local employment. Unfortunately, the lack of relevant data to estimate employment at a local level in Mexico has been a major drawback in this thesis.

Turning to other regressors, the fiscal dummy variable was not significant and the recession dummy had a negative impact on employment as expected. Focusing on Education, there is a positive relationship between employment and human capital at a country and state level in Mexico. Rothwell and Berube (2012, p.1) state that metropolitan areas with lower level of education have experienced higher unemployment than other areas which present higher qualified employees, due to the fact that educated workers can have more stability, competitiveness and entrepreneurial mindset. Consequently, skilled workers will have higher wages, greater employment opportunities and the possibility of higher mobility in income. Population growth has a negative and significant effect on employment when I consider state group intercepts. Results differ according to demography and employment structure among other factors. Bloom and Freeman (1996 p.382) consider that the effect of population on employment depends upon its rate of growth compared with economic growth, which could in turn lead to positive, negative or neutral effects.

## Table 2.22 Cross Sectional Dependence and Heteroskesdasticity Tests

| Test | Value | p-value |
|---|---|---|
| Pesaran's | 2.83 | 0.00 |
| Mod. Wald test | 5657.39 | 0.00 |

## Table 2.23 Fisher Unit Root Test

| Unit Root Test | t-statistics | p-value |
|---|---|---|
| Employment rate | 74.21 | 0.18 |
| Direct tax | 85.67 | 0.04 |
| Indirect tax | 217.36 | 0.00 |
| Non-earmarked transfers | 140.11 | 0.00 |
| Capital expenditure | 171.22 | 0.00 |
| Fiscal reform | 67.81 | 0.35 |
| Recession dummy | 5.45 | 1.00 |
| Real GDP per capita | 86.43 | 0.03 |
| Average years of education | 83.41 | 0.05 |
| Population growth | 347.50 | 0.00 |
| New trucks sold | 30.41 | 1.00 |

## Table 2.24 Collinearity Test

| | Collinearity statistics | |
|---|---|---|
| VARIABLES | Tolerance | VIF |
| Direct tax | 0.27 | 3.65 |
| Indirect tax | 0.73 | 1.37 |
| Non-earmarked transfers | 0.85 | 1.18 |
| Capital expenditure | 0.95 | 1.05 |
| Real GDP per capita | 0.70 | 1.44 |
| Average years of education | 0.42 | 2.36 |
| Population growth | 0.64 | 1.56 |
| New trucks sold | 0.31 | 3.24 |

## Table 2.25 Pooled Employment Regression across Mexican States 1994-2010

| | Fixed effects | GMM | Baseline specification | New trucks sold to the public added |
|---|---|---|---|---|
| **VARIABLES** | | | (1) | (2) |
| **Fiscal policy variables** | | | | |
| **Revenue** | | | | |
| Direct tax | -26.62***<br>(9.05) | -166.84***<br>(3.38) | -26.62*<br>(12.80) | -24.56*<br>(12.56) |
| Indirect tax | -3.95<br>(27.61) | -234.05***<br>(20.97) | -3.95<br>(14.88) | 9.21<br>(18.78) |
| Non-earmarked transfers | 1.53<br>(1.01) | 11.80***<br>(1.11) | 1.53<br>(1.03) | 1.15<br>(1.15) |
| **Expenditure** | | | | |
| Capital expenditure | -1.59<br>(1.69) | -40.48***<br>(2.16) | -1.59<br>(1.00) | -1.08<br>(0.98) |
| **Control variables** | | | | |
| Fiscal reform | | ---<br>--- | 6.27<br>(7.38) | 1.03<br>(7.31) |
| Recession dummy | 0.12<br>(1.21) | -71.89***<br>(0.99) | -0.73***<br>(0.18) | -0.93***<br>(0.17) |
| Real GDP per capita | 0.75***<br>(0.20) | 1.16***<br>(0.15) | 0.75**<br>(0.25) | 0.77***<br>(0.25) |
| Average years of education | 1.55*<br>(0.92) | 11.28***<br>(0.12) | 1.55*<br>(0.72) | 2.16**<br>(0.74) |
| Population growth | -1.02*<br>(0.54) | -0.41***<br>(0.11) | -1.02*<br>(0.53) | -1.25*<br>(0.65) |
| New trucks sold | | | | 0.44*<br>(0.25) |
| Observations | 448 | 448 | 448 | 442 |
| Number of states | 32 | 32 | 32 | 32 |
| F - statistic | 10.60*** | 3330*** | 749175*** | 448099*** |
| R - squared | 0.349 | --- | 0.996 | 0.996 |

Notes: Dependent variable formal employment rate per capita annual percentage growth rate. Independent variables have one period lagged values. Annual data for 1994-2010. All regressions also contain year dummies and a constant term. SE are reported in parentheses. The estimators used are fixed effects, system GMM and the Discroll and Kraay (1998) that accounts for autocorrelation, heteroskedasticity and cross sectional dependence. Fisher Unit Root Test was conducted to all regression variables and accepting in most of them the alternative hypothesis of at least one Panel being stationary at a 10% level. ***(**/*) denotes statistically significant at the 1%(5%/10%) level.

## Table 2.26 Employment Regression with State Group Interactions by Income Level for Mexico from 1994-2010

| | Fixed Effects | GMM | Baseline specification | New trucks sold to the public added |
|---|---|---|---|---|
| **VARIABLES** | | | (1) | (2) |
| **Fiscal policy variables** | | | | |
| Direct tax, High income | -21.75 | 11.41** | -21.75 | -15.20 |
| | (17.56) | (4.93) | (12.70) | (13.82) |
| Direct tax, Middle income | -24.23* | -712.46*** | -24.23* | -28.24** |
| | (12.96) | (10.70) | (12.33) | (12.35) |
| Direct tax, Low income | 18.24 | -395.79*** | 18.24 | 21.42 |
| | (24.86) | (32.34) | (20.28) | (22.54) |
| Indirect tax, High income | 7.12 | -441.58*** | 7.12 | 13.32 |
| | (35.51) | (43.64) | (15.85) | (16.47) |
| Indirect tax, Middle income | -31.54 | 196.23*** | -31.54 | -1.76 |
| | (49.78) | (38.21) | (60.88) | (58.01) |
| Indirect tax, Low income | 126.17 | -211.84*** | 126.17*** | 130.67*** |
| | (80.76) | (45.67) | (41.31) | (37.78) |
| Non-earmarked transfers, High income | 1.68 | -28.67*** | 1.68 | 0.57 |
| | (2.48) | (1.58) | (2.05) | (2.53) |
| Non-earmarked transfers, Middle income | -0.29 | 29.99*** | -0.29 | -0.27 |
| | (1.38) | (1.50) | (0.76) | (0.75) |
| Non-earmarked transfers, Low income | 3.21** | -15.25*** | 3.21*** | 2.68** |
| | (1.36) | (2.11) | (0.82) | (0.93) |
| Capital expenditure, High income | -3.90 | 10.32*** | -3.90*** | -1.41 |
| | (3.37) | (3.97) | (1.25) | (1.43) |
| Capital expenditure, Middle income | 1.16 | -12.07*** | 1.16 | 0.45 |
| | (2.37) | (2.77) | (1.60) | (1.58) |
| Capital expenditure, Low income | -4.46 | -1.31 | -4.46*** | -3.90*** |
| | (3.22) | (4.94) | (1.33) | (1.15) |
| **Control variables** | | | | |
| Fiscal reform | | | 0.00 | 1.92 |
| | | | (0.00) | (7.26) |
| Recession dummy | 0.29 | -36.74*** | 8.13 | -0.87*** |
| | (1.33) | (1.75) | (7.56) | (0.23) |
| Real GDP per capita | 0.79*** | -0.01 | 0.79** | 0.78** |
| | (0.21) | (0.24) | (0.29) | (0.27) |
| Average years of education | 1.13 | 7.30*** | 1.13 | 1.88** |
| | (1.01) | (0.20) | (0.85) | (0.84) |
| Population growth | -1.44** | 2.70*** | -1.44*** | -1.54** |
| | (0.57) | (0.22) | (0.45) | (0.56) |
| New trucks sold | | | | 0.45* |
| | | | | (0.25) |
| Observations | 448 | 448 | 448 | 442 |
| Number of states | 32 | 32 | 32 | 32 |
| F - statistic | 8.025*** | 1375*** | 2728*** | 626.4*** |
| R - squared | 0.367 | --- | 0.367 | 0.378 |

Notes: Dependent variable formal employment rate per capita annual percentage growth rate. Independent variables have one period lagged values. Annual data for 1994-2010. All regressions also contain year dummies and a constant term. SE are reported in parentheses. The estimators used are fixed effects, system GMM and the Discroll and Kraay (1998) that accounts for autocorrelation, heteroskedasticity and cross sectional dependence. Fisher Unit Root Test was conducted to all regression variables and accepting in most of them the alternative hypothesis of at least one Panel being stationary at a 10% level. ***(**/*) denotes statistically significant at the 1%(5%/10%) level.

### *2.4.4 Conclusion*

The institutional framework, the inequality and the high level of heterogeneity between states has to be considered in order to properly understand intergovernmental relationships in Mexico. When evaluating trends of income and government expenditure components and their impact on growth and employment, no straight-forward approach can be used in order to maximise local revenue while at the same time be able to guarantee local service provision. Although Mexico has a large federation history, equilibrium responsibilities between the three levels of government have to be tackled to attain sound public finances, efficiency, transparency, accountability, adequate reporting, supervision and compliance with an appropriate legal framework.

**Growth**

States generate less than 12 percent of their resources with local taxes, with the exception of Mexico City that generates almost half of its total income with local sources. As it will be explained in the next chapter, Mexican localities are also highly unequal, therefore, within the same state it is possible to find very poor and very rich municipalities. In the state of Mexico for instance, only 19 municipalities generate 90 percent of the state industrial potential out of 125 (Piña and Hernández, 2011), while 35 municipalities have high rates of marginalization and extreme poverty (Millán et al. 2008). Therefore, the possible tax effect might be offsetting even when analysing group of states according to their level of income. However, it is interesting to see that in the country as a whole and with state interactions the effect of indirect taxes is positive and significant only in the high-income localities. According to the tax literature, indirect taxes are regressive although efficient and easy to administrate, therefore, the fiscal burden for the rich would be lower than the fiscal burden for the poor. Moreover, local governments have major challenges with the informal economy and the cost of tax evasion, therefore, they should focus their available resources to strengthen their administrative capacity

together with implementing programs for effective tax collection.

Considering federal transfers, they account for around 80 percent of total income, therefore, accountability and transparency of federal resources would be necessary for tax compliance. Unfortunately, a deficient institutional framework, corruption, opacity and discretion in the use of resources is generalized among Mexican localities (Ugalde, 2015). Thus, the negligible or negative effect of federal transfers could be explained, partially, by these circumstances or maybe because the effects offset between municipalities within the same state.

Subsidies, transfers and aid play an important role in the development of middle and low-income localities, where local governments look forward to promote different areas which the state considers most vulnerable, however, government officials should be cautious with the fiscal cost involved. My results for current and capital spending are consistent with Devarajan's (1996) where current expenditure can boost economic growth in developing economies, while capital expenditure can have a negative effect in developed countries. Besides, data for private investment was not available at a local level for my period of study, therefore, I had to work only with public investment.

The dummy variable I included to evaluate 1998 Federal Reform is a very simple approach that cannot possibly capture the real effect. Unfortunately, without proper data to analyse it at a local level for my period of study, at least I do not want to leave it out because of the relevance of the reform to local finances.

Within all the limitations of my work, considering the lack of data, the weak exogeneity, the short period of study, I did an exercise of computing the impact of several income and expenditure components simultaneously, and I was able to show that the coefficients do vary if taken in isolation or simultaneously. In my understanding, the more variables which are available to analyse, the better,

however, multicollinearity problems might arise when taking into account too many components.

**Employment**

According to my study, direct taxes have a negative and significant effect on employment rate in Mexico as a country and in the high and middle-income group. However, indirect taxes for the low-income states show a positive sign, perhaps because this type of taxes are regressive and the income effect is greater than the substitution effect for poor localities.

Regarding non-earmarked transfers, I find a positive and significant association with employment when considering group intercepts in low income groups. This result would indicate that perhaps the non-conditional resources are used to increase bureaucracy. Concerning capital expenditure, I find a negative relationship in low income and high-income groups. This result is particularly puzzling; however, misallocations of capital spending might be occurring, corruption in the public tendering processes involved and also informal employment - with millions of people operating outside government regulations. Therefore, Mexican government should encourage those in the informal economy into paying taxes gradually and incorporate them to the formal sector by providing them sources of employment, stable incomes and comprehensive social security.

Consequently, a unique generalised formula for State development cannot be derived. As I have seen, the Mexican Inter-governmental framework is highly centralised and a high amount of local resources derive from state and federal shares and contributions; however, a better institutional framework, a more accurate legislation to acknowledge local responsibilities on federal resources and formulas which properly recognise disparities among localities, must be considered to promote growth and employment and overcome regional inequalities.

# 3. Mexico: Municipal Fiscal Analysis

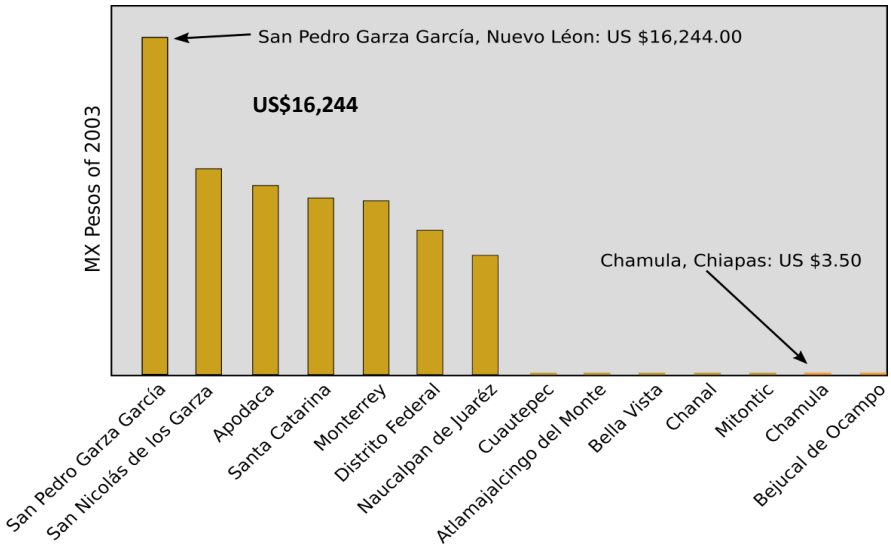
## *3.1 An Overview of Local Government Finance*

Local government finances in Mexico become relevant in a framework where around 75 percent of their total resources are from transfers. According to De la Torre (2012), regional disparities among regions are immense since some jurisdictions in Mexico City can have a similar development to cities in Europe (Italy), while less development localities can have similar development to countries in Africa (Malawi). In an attempt to alleviate inequality in Mexico, during 2007 and onwards, the Federal Government has targeted special resources to the lowest Human Development Index Municipalities. González (2003) state that the responsibilities of different levels of government should be revisited to harmonise public administration in the three levels of government. Accountability and transparency should be addressed to have sound local public finances. In his study, he finds a contrast between urban and rural municipalities whose spending patterns follow distinct trends. Urban municipalities expenditure follows a spending trend more related to their own source income, while rural municipalities expenditure relies heavily on central government transfers.

Own source income of localities has evolved on average between 14.0 and 17.6 percentage points from the late nineties until 2010. According to INEGI (2012), 10.4 percent of total income is from taxes, while utilities account for 4.4 percent of total revenue; however, only 74 municipalities collected 52 percent of total municipal property tax. If I compare the collection in terms of GDP, property tax and utilities have evolved from levels in 2001 of 0.36 and 0.26, respectively, to levels of 0.30 and 0.22 percent. Federal resources from unconditional and conditional transfers represent 32 and 33 percentual points. Turning to expenditure figures, personal services accounted for 59.1 percentage points of total spending in 1997 and decreased to 31.4 percent in 2010, while public

investment and social actions represented 21.3 and 27.7 percentage points during the same period.

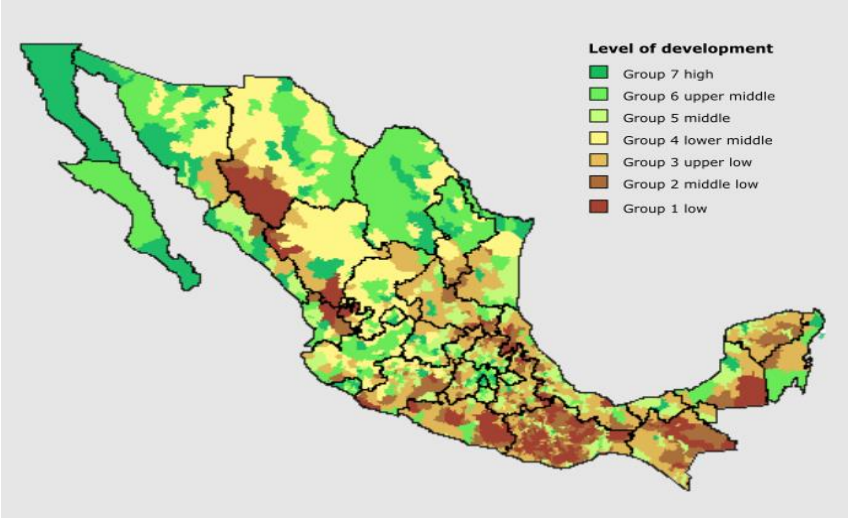
**Graph 3.1 Municipal Production per capita (2003)**




Source: González (2003, p.11)

Mexican National Statistics Institute considering the Mexican Census of Population and Employment 2000, classifies municipalities into 7 groups; where Group 1 represents the municipalities where there is less relative advantage of socioeconomic development and Group 7 stands for localities with the higher relative advantage compared to the other groups.

**Figure 3.1 Socio-economic regions of Mexico**

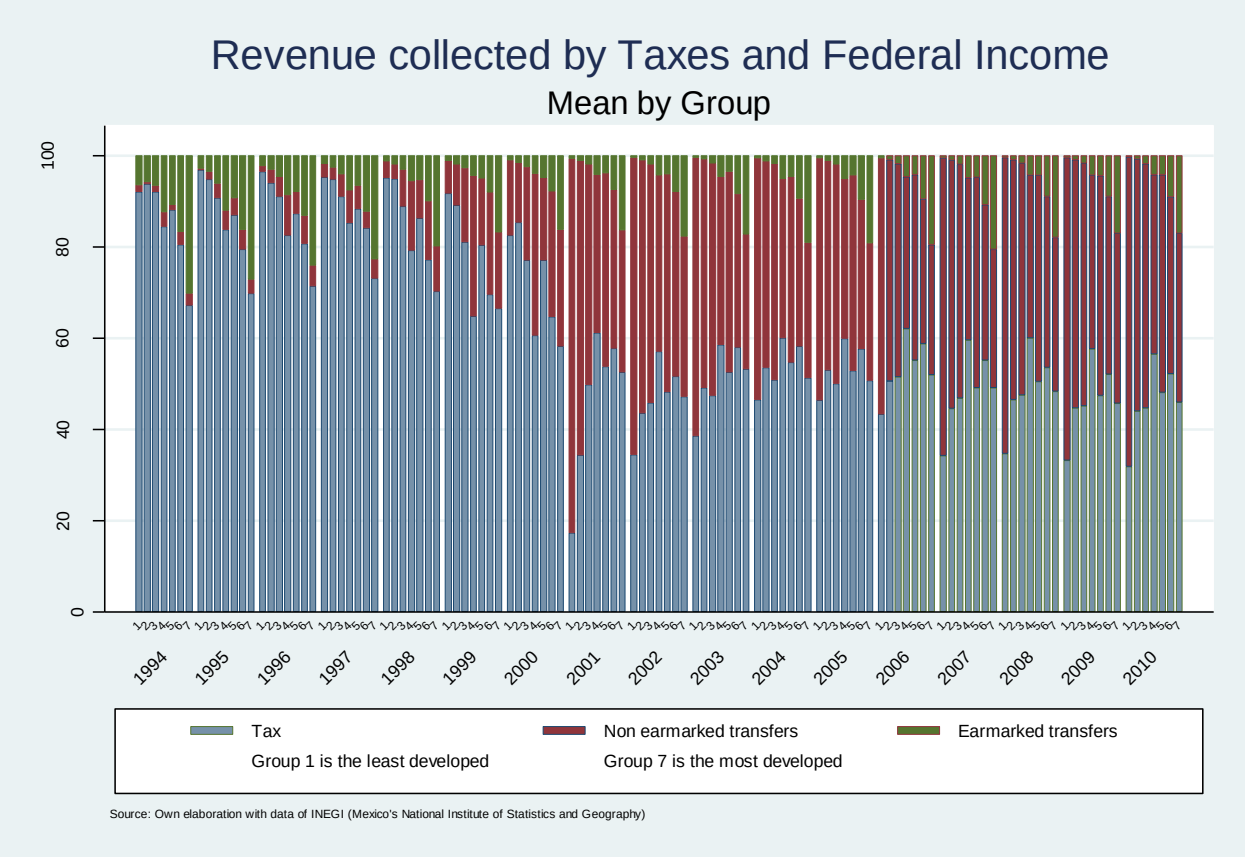



Source: Socioeconomic regions of Mexico (INEGI, 2015, p.1)

The development of municipalities is quite unequal in Mexico, where resources, services, qualified human capital, investment, technology and telecommunications are mainly in the big urban cities, while the poorest communities not only lack of adequate human and material resources but have the worse institutional framework. As a comparison, only 309 municipalities in Mexico out of 2,247 generate 74 percent of national GDP and concentrate 53 percent of the population. The valley of Mexico for instance, with about 1 million inhabitants, produced about 25 percent of Mexico's GDP. Cities like Monterrey, Ciudad del Carmen and Guadalajara produced between 8 and 4 percentage points of national GDP. Among the most touristic cities are Los Cabos, Cancun and Puerto Vallarta; while Aguascalientes, Queretaro, Saltillo and Chihuahua are manufacturer centres; oil production cities are Ciudad del Carmen, Cardenas and Poza Rica; Saltillo and Aguascalientes are known for their automotive industry; while aerospace industry develops in Chihuahua and Queretaro (IMCO, 2014). Formal employment is linked to more productive cities, however, in Mexico the informal sector is capable of generating faster employment to the population, however, according to Busso et al. (2012) a peso invested in a formal and legal enterprise accounts for additional 50 percentage points of wealth, compared to an informal and illegal corporation.

In contrast to the rich and developed municipalities, seventy percent of the people in poverty live in 1,222 municipalities, and forty percent of municipalities account for more than eighty-seven percent of the poor population. In Oaxaca, San Juan Tepeuxila, has 97.4 percent of its inhabitants living in poverty, by contrast, Benito Juárez neighbourhood in Mexico City, has the lowest portion of the poor with only 8.7 percent. According to the Municipal Human Development Index in 2004, Benito Juárez neighbourhood had an index of 0.951, while Coachoapa in Guerrero, the index was only of 0.43. In this sense, Mexico is indisputably a nation of inequality. (Robles Narro et al., 2013). Regarding health and education indexes, the more disadvantaged states are: Guerrero, Oaxaca, Chiapas, Michoacán, Veracruz, Zacatecas, Yucatan, Puebla and Guanajuato, while the more advanced are Mexico City, Nuevo León, Baja California, Coahuila, Sonora, Aguascalientes and Guadalajara.

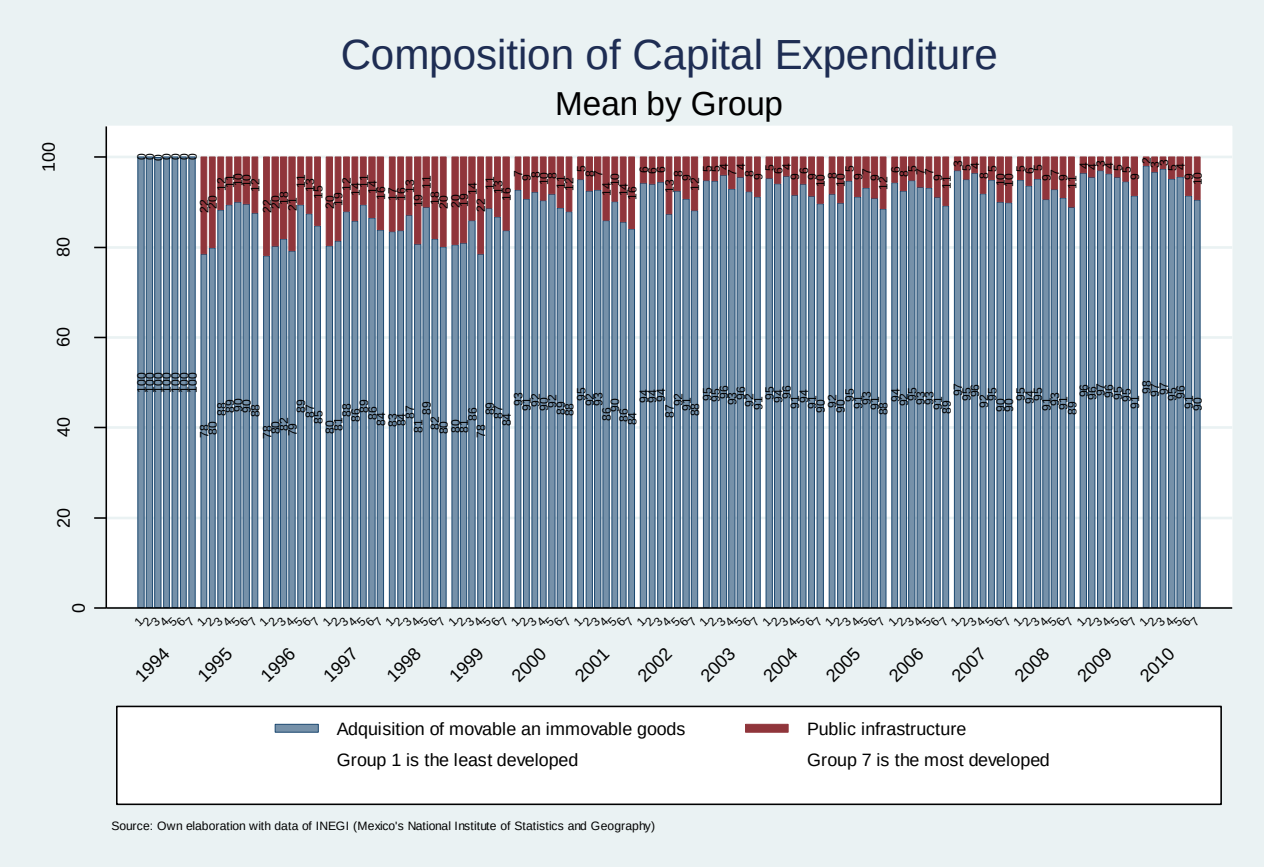
**Graph 3.2 Municipal Income by Group 1994-2010**



## Table 3.1 Municipal Income by Group 1994-2010

| Group | Variable | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Non-earmarked Transfers | 69.62 | 71.69 | 81.83 | 84.46 | 81.93 | 83.84 | 75.52 | 12.29 | 31.28 | 34.13 | 41.98 | 44.18 | 39.22 | 29.75 | 31.39 | 28.45 | 29.07 |
| | Earmarked Transfers | 1.13 | 0.31 | 1.05 | 2.64 | 3.19 | 6.58 | 15.11 | 58.54 | 59.21 | 53.95 | 47.85 | 50.57 | 50.86 | 56.62 | 58.74 | 56.92 | 61.87 |
| | Revenue collected by taxes | 4.87 | 2.06 | 1.88 | 1.60 | 1.03 | 1.04 | 0.90 | 0.47 | 0.40 | 0.37 | 0.52 | 0.57 | 0.47 | 0.48 | 0.43 | 0.38 | 0.34 |
| 2 | Non-earmarked Transfers | 0.36 | 1.34 | 2.67 | 2.27 | 2.65 | 8.16 | 11.80 | 44.38 | 48.42 | 44.11 | 40.62 | 42.70 | 44.04 | 46.06 | 47.75 | 47.63 | 50.05 |
| | Earmarked Transfers | 4.72 | 2.82 | 2.62 | 2.33 | 1.59 | 1.69 | 1.43 | 0.76 | 0.87 | 0.71 | 1.14 | 1.01 | 0.85 | 0.84 | 0.82 | 0.73 | 0.73 |
| | Revenue collected by taxes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | Non-earmarked Transfers | 76.28 | 73.53 | 77.31 | 79.87 | 75.82 | 72.12 | 68.59 | 41.50 | 40.66 | 42.32 | 45.08 | 45.41 | 45.52 | 40.62 | 42.32 | 39.39 | 40.00 |
| | Earmarked Transfers | 1.16 | 2.61 | 3.72 | 4.20 | 6.94 | 14.49 | 18.24 | 40.29 | 46.37 | 45.42 | 42.09 | 43.66 | 41.22 | 44.47 | 45.20 | 46.39 | 47.95 |
| | Revenue collected by taxes | 5.41 | 4.93 | 3.91 | 3.62 | 2.57 | 2.45 | 2.20 | 1.57 | 1.68 | 1.49 | 1.64 | 1.75 | 1.56 | 1.68 | 1.55 | 1.47 | 1.57 |
| 4 | Non-earmarked Transfers | 64.63 | 66.70 | 67.11 | 68.78 | 63.82 | 54.34 | 51.95 | 51.91 | 46.89 | 49.07 | 51.06 | 51.03 | 51.39 | 49.51 | 50.69 | 47.60 | 48.43 |
| | Earmarked Transfers | 2.42 | 3.34 | 7.26 | 5.73 | 12.28 | 25.75 | 30.36 | 29.44 | 31.81 | 30.82 | 29.74 | 29.90 | 27.49 | 29.49 | 30.22 | 31.47 | 33.73 |
| | Revenue collected by taxes | 9.46 | 9.53 | 6.98 | 6.13 | 4.47 | 3.74 | 3.43 | 3.51 | 3.50 | 3.92 | 4.33 | 4.31 | 3.86 | 4.07 | 3.62 | 3.59 | 3.62 |
| 5 | Non-earmarked Transfers | 70.56 | 70.82 | 73.13 | 75.47 | 71.10 | 68.34 | 66.21 | 45.27 | 41.13 | 45.92 | 47.32 | 46.24 | 47.59 | 41.65 | 43.72 | 40.34 | 41.35 |
| | Earmarked Transfers | 0.87 | 3.07 | 4.06 | 4.38 | 6.90 | 12.48 | 15.59 | 35.72 | 40.73 | 38.43 | 35.26 | 37.44 | 35.23 | 39.16 | 39.26 | 41.07 | 41.13 |
| | Revenue collected by taxes | 8.64 | 7.57 | 6.60 | 5.60 | 4.37 | 4.26 | 4.13 | 3.20 | 3.47 | 3.07 | 4.02 | 3.77 | 3.58 | 4.07 | 3.73 | 3.72 | 3.61 |
| 6 | Non-earmarked Transfers | 58.59 | 60.44 | 63.30 | 66.12 | 60.36 | 57.19 | 53.40 | 47.19 | 40.90 | 46.26 | 46.58 | 45.88 | 46.04 | 42.87 | 42.98 | 40.66 | 41.65 |
| | Earmarked Transfers | 2.04 | 3.31 | 4.82 | 2.89 | 10.05 | 18.42 | 22.71 | 28.43 | 32.06 | 26.92 | 25.89 | 26.03 | 24.92 | 26.51 | 30.09 | 30.40 | 30.93 |
| | Revenue collected by taxes | 12.13 | 12.34 | 10.36 | 9.66 | 7.80 | 6.58 | 6.44 | 6.14 | 6.34 | 6.69 | 7.53 | 7.67 | 7.45 | 8.42 | 7.16 | 6.99 | 7.24 |
| 7 | Non-earmarked Transfers | 46.00 | 48.59 | 51.72 | 53.73 | 50.54 | 49.66 | 44.31 | 40.01 | 34.82 | 39.56 | 37.53 | 37.19 | 39.23 | 35.94 | 37.36 | 34.60 | 34.88 |
| | Earmarked Transfers | 1.79 | 2.14 | 3.28 | 3.09 | 7.12 | 12.50 | 19.53 | 23.78 | 25.89 | 22.04 | 21.66 | 22.03 | 21.54 | 22.21 | 26.02 | 28.16 | 28.11 |
| | Revenue collected by taxes | 20.66 | 18.89 | 17.40 | 16.68 | 14.26 | 12.54 | 12.37 | 12.48 | 13.12 | 12.83 | 13.98 | 14.06 | 14.73 | 15.03 | 13.86 | 12.90 | 12.93 |

**Graph 3.3 Municipal Expenditure by Group 1994-2010**

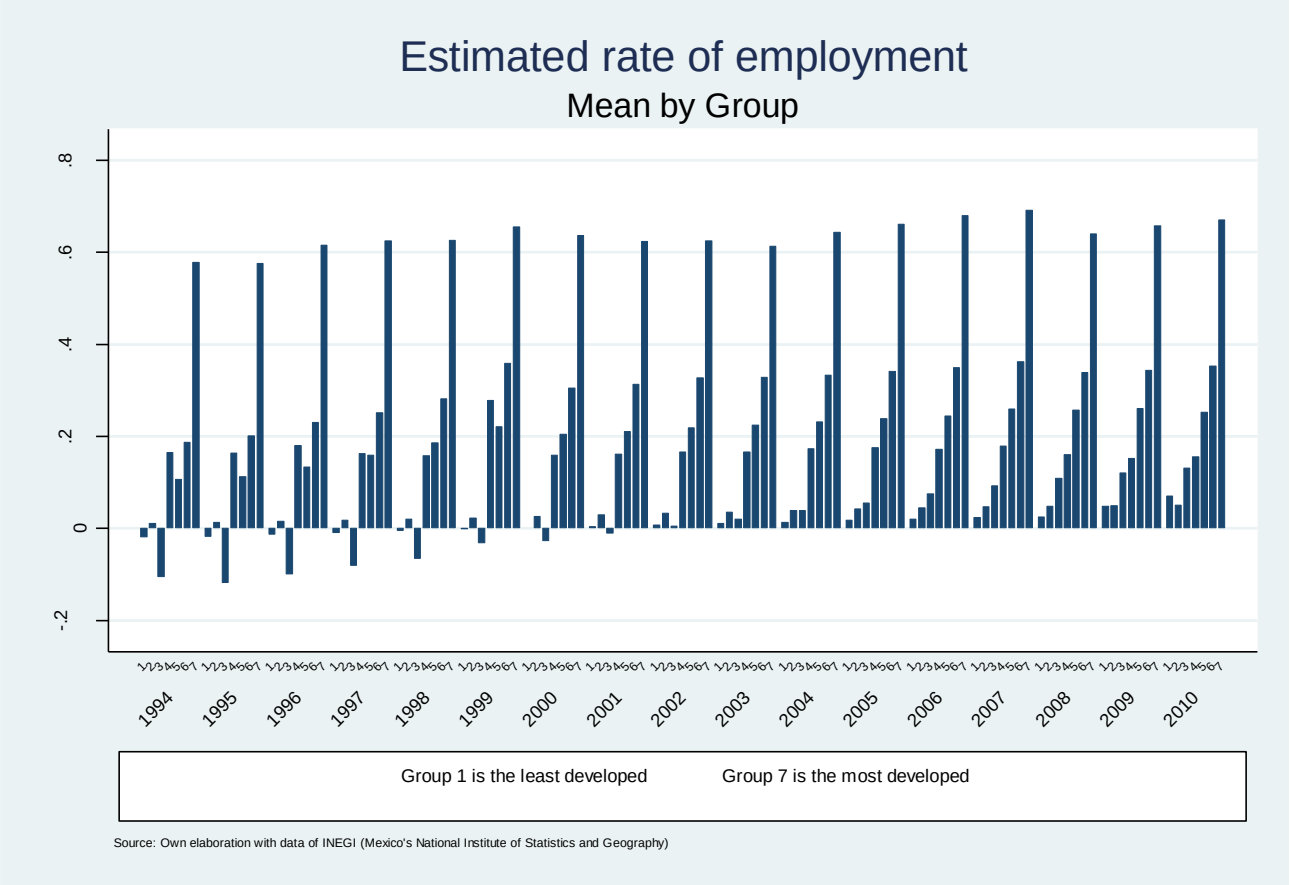


## Table 3.2 Municipal Expenditure by Group 1994-2010

| Group | Variable | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Public Infrastructure | 30.52 | 26.50 | 18.61 | 24.32 | 24.84 | 13.91 | 20.17 | 47.36 | 45.21 | 41.17 | 49.32 | 32.45 | 43.91 | 48.65 | 47.70 | 52.80 | 53.51 |
| | Aquisition of Movable and Immovable Goods | 0.00 | 7.29 | 5.23 | 5.97 | 4.93 | 3.37 | 1.59 | 2.51 | 2.78 | 2.26 | 2.46 | 2.92 | 2.67 | 1.51 | 2.60 | 2.00 | 1.06 |
| 2 | Public Infrastructure | 30.15 | 25.60 | 20.93 | 24.83 | 25.00 | 16.02 | 21.14 | 39.17 | 40.59 | 35.06 | 41.98 | 28.74 | 37.81 | 41.73 | 38.72 | 44.72 | 44.68 |
| | Aquisition of Movable and Immovable Goods | 0.00 | 6.45 | 5.17 | 5.67 | 4.88 | 3.79 | 2.17 | 3.22 | 2.60 | 2.00 | 2.65 | 3.29 | 3.09 | 2.18 | 2.62 | 2.10 | 1.56 |
| 3 | Public Infrastructure | 26.71 | 23.86 | 19.13 | 22.22 | 21.46 | 19.04 | 22.27 | 33.30 | 36.29 | 36.95 | 39.58 | 32.67 | 36.62 | 39.68 | 37.14 | 42.54 | 41.15 |
| | Aquisition of Movable and Immovable Goods | 0.04 | 3.19 | 4.27 | 3.07 | 3.19 | 3.12 | 1.89 | 2.65 | 2.15 | 1.58 | 1.80 | 1.86 | 2.01 | 1.50 | 1.90 | 1.32 | 1.14 |
| 4 | Public Infrastructure | 19.41 | 16.40 | 12.68 | 14.89 | 15.59 | 15.65 | 22.72 | 22.59 | 22.62 | 26.67 | 26.17 | 24.85 | 27.29 | 25.16 | 26.99 | 33.05 | 29.80 |
| | Aquisition of Movable and Immovable Goods | NA | 1.95 | 3.34 | 2.48 | 3.75 | 4.29 | 2.42 | 3.71 | 3.29 | 2.05 | 2.44 | 2.40 | 1.97 | 2.23 | 2.80 | 1.27 | 1.53 |
| 5 | Public Infrastructure | 27.05 | 23.15 | 23.50 | 24.24 | 21.40 | 19.98 | 21.92 | 29.35 | 30.46 | 30.55 | 32.82 | 28.28 | 30.93 | 32.37 | 30.61 | 37.39 | 33.76 |
| | Aquisition of Movable and Immovable Goods | NA | 2.57 | 2.80 | 2.87 | 2.70 | 2.58 | 1.97 | 3.22 | 2.48 | 1.44 | 2.13 | 2.07 | 2.27 | 1.76 | 2.37 | 1.77 | 1.54 |
| 6 | Public Infrastructure | 20.56 | 16.24 | 15.63 | 15.96 | 16.12 | 17.90 | 19.60 | 19.82 | 21.41 | 22.64 | 22.99 | 21.88 | 22.59 | 20.21 | 23.82 | 28.57 | 24.40 |
| | Aquisition of Movable and Immovable Goods | 0.00 | 1.90 | 2.26 | 2.50 | 3.57 | 2.73 | 2.48 | 3.33 | 2.20 | 1.88 | 2.19 | 2.21 | 2.24 | 2.24 | 2.37 | 1.65 | 2.31 |
| 7 | Public Infrastructure | 22.73 | 18.11 | 15.16 | 15.77 | 17.45 | 17.53 | 19.33 | 19.23 | 19.24 | 21.41 | 21.20 | 20.07 | 18.63 | 19.59 | 22.54 | 23.77 | 21.26 |
| | Aquisition of Movable and Immovable Goods | NA | 2.57 | 2.74 | 3.04 | 4.35 | 3.43 | 2.65 | 3.64 | 2.59 | 2.08 | 2.46 | 2.62 | 2.28 | 2.22 | 2.85 | 2.25 | 2.25 |

1) N.A. Value not available

**Graph 3.4 Entitled Population for Social Security in Municipalities by Group 1994-2010**



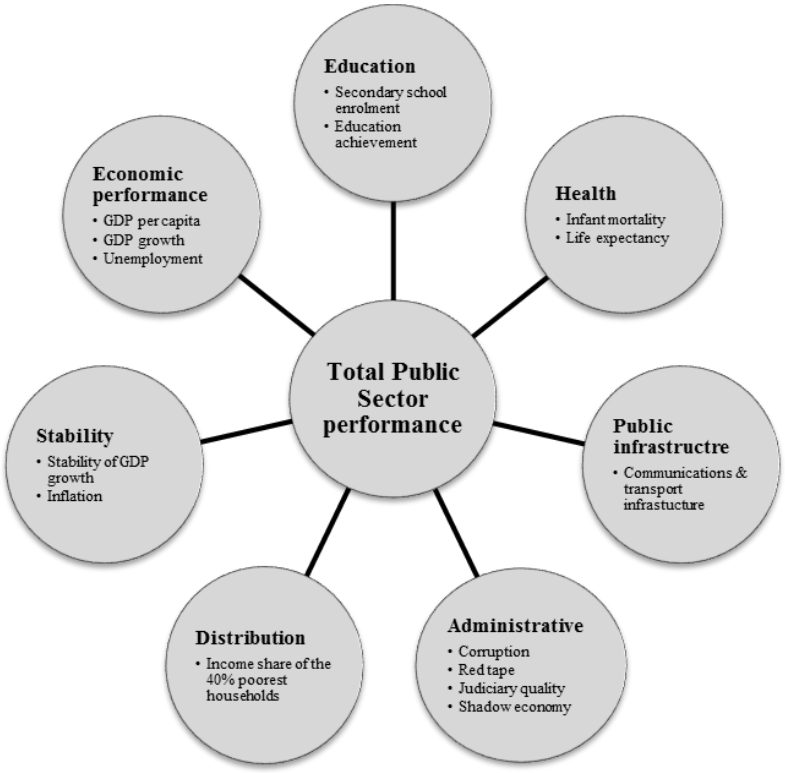

Source: Own elaboration with data of INEGI (Mexico's National Institute of Statistics and Geography)

**Table 3.3 Entitled Population for Social Security in Municipalities by Group 1994-2010**

| Group | Variable | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Rate of employment | -1.90 | -1.76 | -1.33 | -0.96 | -0.58 | -0.19 | 0.16 | 0.45 | 0.75 | 1.09 | 1.35 | 1.86 | 2.06 | 2.33 | 2.44 | 4.78 | 7.04 |
| 2 | Rate of employment | 1.10 | 1.31 | 1.58 | 1.77 | 2.08 | 2.33 | 2.60 | 2.94 | 3.27 | 3.59 | 3.91 | 4.28 | 4.51 | 4.75 | 4.82 | 4.92 | 5.07 |
| 3 | Rate of employment | -10.62 | -11.80 | -10.03 | -8.17 | -6.54 | -3.23 | -2.73 | -1.16 | 0.53 | 2.05 | 3.87 | 5.59 | 7.55 | 9.22 | 10.88 | 12.07 | 13.10 |
| 4 | Rate of employment | 16.51 | 16.36 | 18.08 | 16.33 | 15.81 | 27.81 | 15.90 | 16.18 | 16.62 | 16.68 | 17.30 | 17.62 | 17.22 | 17.89 | 16.09 | 15.26 | 15.63 |
| 5 | Rate of employment | 10.73 | 11.27 | 13.33 | 15.94 | 18.57 | 22.13 | 20.43 | 21.07 | 21.94 | 22.49 | 23.11 | 23.86 | 24.42 | 25.97 | 25.72 | 26.05 | 25.25 |
| 6 | Rate of employment | 18.74 | 20.13 | 23.01 | 25.18 | 28.18 | 35.87 | 30.53 | 31.38 | 32.73 | 32.81 | 33.33 | 34.19 | 34.92 | 36.29 | 33.94 | 34.41 | 35.28 |
| 7 | Rate of employment | 57.87 | 57.58 | 61.57 | 62.55 | 62.61 | 65.59 | 63.71 | 62.41 | 62.52 | 61.31 | 64.32 | 66.07 | 68.02 | 69.13 | 63.98 | 65.78 | 67.06 |

In this context, when evaluating a particular fiscal policy, the quality of the measures undertaken and the effectiveness of the public sector is fundamental at a local level. Taking into consideration the importance of governmental efficiency, Afonso et al (2005 p.324) calculates "public sector performance" and "public sector efficiency indicators" for 23 developed economies (Figure 3.2). In this respect, it would be desirable to calculate the above-mentioned indicators at a local level, in order to link inputs, outputs and the efficiency in the use of those resources.

**Figure 3.2 Total Public-Sector Performance Indicator**




Source: Modified version of Figure 1 in Afonso et al (2005 p.324)

## *3.2 Local Public Finance: some literature insights*

A virtuous path between financial autonomy and local development could guarantee the success of economic performance at a local level (Dahl & Díaz-Bay, 2014). Consequently, local authorities should manage in the most effective way possible their resources and outlays: the composition of direct or indirect taxes, central government transfers and current and capital expenditures.

Barro and Sala-i-Martin (2003 p.522) have developed a cross-country analysis of average growth rate of GDP per capita in terms of explanatory variables, covering the level of educational attainment, life expectancy, investment (relative to GDP), and terms of trade, as well as fiscal indicators such as the ratio of government spending relative to each country's GDP. When dealing with local growth, it is necessary to consider the economy of a particular place and understand the process by which individuals respond to incentives and how they choose to live in areas where their needs are best satisfied. Workers will move where they receive higher wages, while firms will seek lower hiring costs. In this respect, spatial economics could provide insights to economic activity within a locality and shed light on the mechanisms which contribute to growth and development. It has been argued that the policymaking process should take into consideration the complexity of local entities and priorities, while at the same time empowering actors so they actively lead their own development (Bowley et al., 2010).

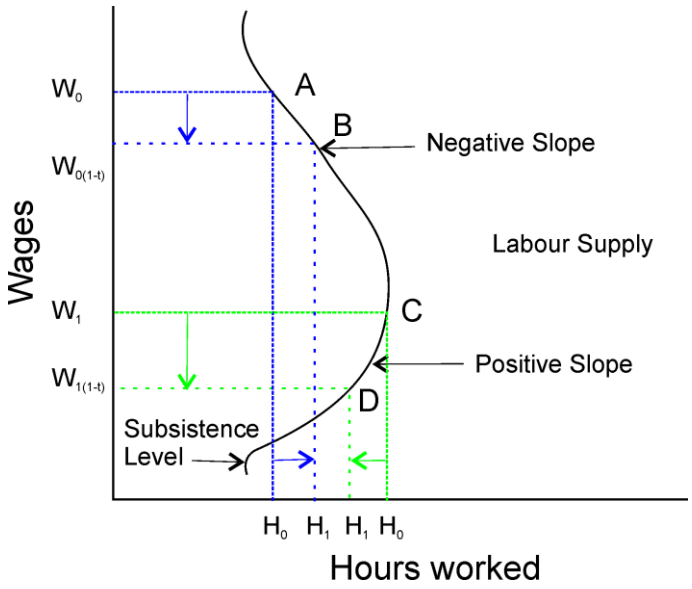
### *3.2.1 Income*

The fact that there are vertical and horizontal imbalances between sub-national governments reflect different results for the effect of direct and indirect taxes on GDP per capita on Mexican states and municipalities. As can be seen in Graph 3.5, the effect of a particular tax (t) on wages (w) depends upon the level of wage. If the labour supply in a particular locality is in the area of a positive slope, an increase of taxes, can in fact decrease labour and even revenue

collection. Though, if the labour supply at a given locality is in the negative slope end, an increase of taxes can lead to more hours being worked and even a higher tax revenue.

When wages increase, there are two effects involved; the income effect, which makes the employee wealthier, work less hours and enjoy more time of leisure; and the substitution effect. which leads the employee to work more because the opportunity cost of leisure increases hours worked. When wages increase and the hours worked decrease, the income effect is higher than the substitution effect (negative slope), however, hours worked increase in case the substitution effect is higher than the income effect (positive slope). Correspondingly, if the income effect is higher than the substitution effect and taxes increase, the wages decline and the hours worked rise and revenue collection expands as well (point A to B). The opposite happens in case the substitution effect is higher than the income effect and then when taxes rise, the wages decrease, hours worked decline (point C to D) and revenue might shrink as well.

**Graph 3.5 Effect of Tax on Labour Supply**




Source: Stiglitz (2000 p.537)
*Subsistence level is not in the original graph

However, according to Felder (1988, p.10), leisure could be a luxury only after an individual has the minimum acceptable nourishment, cloth and housing levels,

therefore, under the afore mentioned circumstances, the supply curve could be downward sloping (subsistence level).

### *3.2.2 Spending*

Growth can be achieved if productive expenditure (i.e. highways, investment, machinery and equipment) is utilised and proper fiscal rules are implemented (Guillemette, 2010). Considering the overall picture of economic development, governments should take into account which financing method could be the most accurate at a particular point in time, because of the trade-offs of applying a particular tax. For instance, if a locality requires additional resources to provide better public services, the local government can either raise direct or indirect taxation, increase the price paid by taxpayers for public goods and services or issue debt. Local authorities have also to consider the best way to canalise resources, either to build a school or a hospital, improve the prevalent education and medical infrastructure, build a new road or improve an old one, increase transfers and subsidies to the population or invest in sewage and drainage. (Pérez Fuentes Alemán, 1995).

In this respect, Chart 3.1 illustrates the effect of taxes, expenditure and debt on growth.

**Chart 3.1 Growth effects according to financing and spending**

<table>
<tr><th colspan="2" rowspan="2">Financing method</th><th colspan="3">Spending type</th><th rowspan="2">Budget surpluses</th></tr>
<tr><th colspan="2">Production Related</th><th>Non Production Related</th></tr>
<tr><td rowspan="3">Taxes</td><td rowspan="2">Distortionary</td><td>Low Gov. Size</td><td>High Gov. Size</td><td rowspan="2">Negative</td><td rowspan="2">Ambiguous</td></tr>
<tr><td>Positive</td><td>Negative</td></tr>
<tr><td>Non-Distortionary</td><td colspan="2">Positive</td><td>Null</td><td>Positive</td></tr>
<tr><td colspan="2">Debt</td><td colspan="4">The effect depends upon initial conditions and a prudent level of debt to GDP ratio</td></tr>
<tr><td colspan="2">Budget deficits</td><td colspan="2">Ambiguous</td><td>Negative</td><td></td></tr>
</table>

**Source:** Table 1* in Barrios et al (2009 p.19)
* In the original table debt is not included.

Gemmell, Kneller and Sanz (2012 p.22-23) using 17 OECD countries from 1970 to 2008 find that the nature of expenditure funding matters; whether taxes are raised, deficits are incurred, or there are reductions in specific expenditures. As mentioned earlier, they report positive growth effects for transport and communication, education and health expenditure but negative effects for social welfare spending.

The dynamics of the small local governments can sometimes be different to the larger local governments and the central government, since during the execution stages of public works, they suffer from longer delays when their contracts are complex, long term and mainly financed with external resources, situation that inhibits their capability of delivering the planned benefits. While citizens can be able to evaluate and monitor education services provided, the process of building a school cannot be properly supervised by them. Additionally, other factors contribute to the quality of public works because the local fiscal planner can be captured by firm lobbying for the market and pressure from the local interest groups. Moreover, there is a positive relationship between the local authority term and a worse outcome in the public works process, implying less participation, larger costs and a higher probability that the same company wins several times (Guccio et al., 2014, p.237-239).

### *3.2.3 Intergovernmental Transfers*

According to Breton (2002 p.31-45), intergovernmental competition can lead to inefficient outcomes. There are three main factors in governmental systems: concurrency, standards and administration. Concurrency refers to the power an authority is given to exercise policies in a particular territory. Standards pertain to levels of quality and service provided on regarding dimensions of the policy being applied. Administration of a particular policy refers to how it is implemented by local authorities in their local conditions. The failure of an efficient outcome derives from different information and coordination costs between each level of government, diminishing supply costs and dynamic instability. Furthermore, Breton and Scott (2007 p.22) analysed differences in environmental governance patterns in terms of signalling and mobility costs for the demand side, alongside coordination and administrative costs on the supply side.

Local governments actively seek satisfactory provision of public goods to inhabitants because they are close to them. Recent developments in the new economic geography have shown that there are other factors and incentives that drive people's behaviours, such as: proximity to other economic activity in places where wages and returns to investment seem to be higher, which at the same time are associated with higher living cost and pollution, however a higher propensity for innovation is also feasible and desirable at a local level. (Bowley et al., 2010 p.18-33). Therefore, the differences between income level, employment and social, economic and political performance need be taken into consideration when designing policy, because there will be different outcomes in different localities. From this perspective, empowering and incentivising local governments and actors to actively enhance growth and development within a local framework with distinct characteristics should be viewed as a relevant challenge for new government policy (ibid). A limitation of the current study is that it is unable to measure the above-mentioned incentives, although all the differences are captured in the fixed effect component.

Additionally, with respect to the role of government expenditures within the framework of fiscal federalism, Tiebout (1956) contended that the fiscal policy mix between income and expenditure responsibilities has high variability between different localities and residents will maximise their provision of public services given the tax burden of each locality. Nonetheless, inter-jurisdictional externalities among localities provoke benefits or costs which spill over across different geographic jurisdictions (Hyman, 2008 p.696). This phenomenon occurs when the local authority modifies tax and expenditure provision, affecting the benefit of a resident in another locality by changing the relative prices of public goods provided. In this context, the relative prices do not reflect the public good provision. In the case of Mexico, it is a common practice for taxpayers of neighbouring localities to pay some of their taxes (local ownership or use of vehicles taxes) in vicinities with lower rates. In practice, fiscal authorities are aware of the tax burden prevailing in neighbouring communities for the decision-making process.

Gemmell et al. (2013, p.1928) analyse the development of fiscal decentralization in OECD countries between 1972 and 2005. They showed a negative effect of expenditure decentralization, which could mean that federal government is more efficient in allocating expenditure to productive and national priority areas, and a positive revenue decentralization effect, perhaps because local authorities collect less distortionary taxes than the federal government. However, it is important to consider that in their sample, all the countries have spending shares higher than those of revenue shares with the exception of Mexico. Kappeler et al. (2012, p.1) analyse 20 European countries from 1990 up to 2009, where local infrastructure increases with revenue decentralization. However, the effect is lower if earmarked grants are canalized to capital investment. Public investment by the three levels of government provide infrastructure for roads, bridges, public services and priority areas and can play an important role during downturns and promote productivity growth in the long run. The estimated returns of public investment on private sector productivity ranges between 15 and 45 percent (Bivens, 2012, p.1-2).

Arvate Mattos and Rocha (2013 p.1-43) estimate the effect of intergovernmental transfers from 2001 to 2008 on local public expenditure for Brazilian municipalities with between 10,000 and 61,128 residents. They find that unconditional transfers promote higher spending that would otherwise cause an increase of income, supporting the flypaper effect which precisely supports the fact that a unit of a grant increases spending by more than it would if that money was given to a resident of a particular locality. In Mexico, the effect of transfers on growth, although expected to be positive, in the country as a whole, and at a state level, has been found to be negative. However, when analysing them at a sub-national level, there is a positive effect of non-earmarked (unconditional) transfers on municipalities' growth. Considering earmarked transfers, their effect on growth in Mexico at the country level turns to be negative as well but is not significant.

De Mello Jr. (2002 p.1871, 1881, 1882) estimates the impact on growth on Brazilian municipalities for the years 1985-1994 regarding three spending categories with their corresponding sources of financing: taxes, transfers and debt. His study concludes that growth depends upon the provision of public goods and services from the local community, therefore, each expenditure category should not be analysed in isolation but with consideration of financing mechanisms. In the current study, I find that diverse types of infrastructure have a different impact at a municipal level.

Kappeler et al. (2013 p.15, 24, 25) analyse the effect of revenue decentralization on the provision of public infrastructure in 20 European countries from 1990 up to 2009 at a local level. Their study concludes that tax shares increase public infrastructure at a sub-national level; additionally, investment grants increase investment at a local level. In the case of Mexico in particular, the period of maturity of several types of investment at a local level determines its effect on growth for different time periods. In this current study, when considering different lags (up to five), the outcomes and significance of each variable

changed within group and within the lag considered.

Little has been written about fiscal positions in local governments. During the period 1966-2003, Lan and Sylwester (2010 p.355) focus their work on synchronization in 27 Chinese provinces regarding which they state that provinces with similar budgetary positions have similar business cycle movements. Rodden and Wibbels (2010 p.37) find that sub-national governments in seven federations from 1968 to 2001, have to work on their own when multiple shocks affect the development of their economies, since their own source taxes are pro-cyclical while revenue sharing and transfers behave either in a-cyclical or pro-cyclical manner.

Blochliger et al. (2010 p.6-12) conclude that local governments in 25 OECD countries seemed to be less affected by recessions than central governments, but in fact, have to deal with higher spending and lower tax revenue, when making their own plan for recovery, and therefore appropriate coordination between intergovernmental entities becomes a key factor. In this respect, during the last 30 years, sub-central governments have had lower deficits (around 5 percent) than central governments (up to 25% in the mid 90s) and deficit levels were likely to be counter-cyclical. When comparing net lending with the size of the output gap, the correlation was weaker at a sub-national level compared to the national level. Patterns of revenues were similar, growing during the good times and diminishing in recessions. However, the ratio of sub-central and central government revenue fluctuation was very divergent between countries, reflecting the differences in their tax structures. Spending at a local and a national level was found to be counter-cyclical. Regarding investment, sub-central government's volatility is huge since current spending is invariably politically sensitive and very difficult to modify. Consequently, sub-central fiscal rules could to some extent explain the differences between central and sub-central outcomes.

Handley (2008, p.134) concludes that the task of achieving an adequate balance between federal and local governments is challenging. Therefore, centralization is important to the extent that it promotes a national programme's effectiveness at a sub-national level, however, local governments must strengthen their local capacity. It is vital to harmonise national policies to local realities, since the results of the current work demonstrate a differentiated outcome for various localities in Mexico, according to their level of development. Therefore, the need to adjust national policies to local characteristics is essential in order to promote overall equity and efficiency of the fiscal system.

Drawing on surveys from 1999 and 2006, Binswanger-Mkhize et al. (2012 p.26-27) study 241 villages representing 17 major states of India. Their results demonstrate that villages spend their resources according to their own local priorities. However, when they compare the impacts of one Rupee of grant received with taxes raised, in terms of time fetching water and days lost to illness, they find that tax raised had less impact than grants received. Therefore, the efficiency of grants is higher than own taxes. In Mexico, Sour Laura (2013) corroborates that non-earmarked transfers have a greater effect on local government spending than an equivalent increase in the income of the population at those localities.

## *Externalities between Jurisdictions*

An externality exists when the provision of a particular good or service in a certain locality affects another locality, which is mostly the case for public goods delivered by neighbouring local governments (Barnett, and Topham, 1977 p.53). That is, a particular locality pays the full costs, but recuperates only part of the benefit. An example of this is when Mexico City's public transport facilities and diverse health and education services benefit not only its residents but inhabitants from surrounding localities who work or visit to enjoy these services provided in the capital city. Externalities have a significant role in shaping the products and services provided within localities and although these have been theoretically recognized, empirical studies have not focused on measuring them when

analysing taxes and transfers. This current study acknowledges the fact that in an ideal scenario, it is desirable to measure externalities in order to provide a more accurate fiscal policy impact, however, because of their nature, they are difficult to measure and thus are only mentioned in this section for explanatory purposes. According to Hepple & Rees Hedley (2009, p.2-3) there are three categories of externalities: benefit spillovers where local services benefit non-residents from other localities; crowding spillovers derived from congestion in the use of a local public service (health or education services in the case of Mexico City for instance); and spillovers from expenditure competition. In Mexico, there are different local tax rates for certain goods, therefore localities compete for taxpayers from the neighbouring localities. Solé-Ollé (2006 p.32) utilising data for 2,500 Spanish Municipalities for the year 1999 reported that spillovers are relevant to measuring expenditure policies.

## *Employment*

The particular link between fiscal variables and the labour market has not been broadly studied and is an area in which to develop research. By studying this relationship this current work can offer some insights regarding the management of fiscal policy variables and their influence on employment. Dahlberg et al. (2008 p.30-31) study the impact of government transfers on different types of personnel employed by the sub-national governments in 279 Swedish municipalities from 1996 up until 2004. Their results demonstrate that there is a large and positive effect of transfers on the number of employees in the central administration, but no effects in other sectors. Lundqvist et al. (2014 p.190-191) by updating these results over 279 Swedish municipalities during 1996–2004 confirm that transfers do not stimulate local public employment but results remain positive and significant for administrative personnel. However, these authors opine that perhaps public funds targeted specifically at stimulating employment could have better results than those of unconditional transfers.

Messing (2013 p.37-39) illustrate that large scale untargeted activation and public employment programmes have reached most Roman populations. Public

works can be the only available source of employment to families in extreme poverty. In Slovakia and Bulgaria public employment is an active labour market measure, although welfare benefits are not tied to participation in it.

**Table 3.4 Summary of several empirical studies**

| Author | Sample | Topics Analysed | Method | Main Results |
|---|---|---|---|---|
| **INCOME** | | | | |
| **Dahlby et al. (2012)** | 10 provinces (1977-2006) | Tax Cuts on Economic Growth | Panel Data 2SLS | ➢ Corporate income tax rate is related with lower investment and slower growth.<br>➢ Personal income tax does not affect growth rate and investment. |
| **EXPENDITURE** | | | | |
| **Aschauer (2000)** | 46 Low and Middle Income Countries (1970-1990) | GDP per capita Growth | Cross-Country | ➢ Increases in the quantity or efficiency of public capital have a positive effect in GDP per capita. |
| **Devarajan (1996)** | 43 Developing (1970-1990) | Composition of public expenditure and growth | OLS | ➢ Current expenditures in developing countries boost economic activity more than capital expenditures. |

| Author | Sample | Topics Analysed | Method | Main Results |
|---|---|---|---|---|
| **TRANSFERS** | | | | |
| **Arvate P. Mattos E & Rocha P. (2013)** | Brazil municipalities with residents between 10,000 and 61,128 (2001-2008) | Effect of intergovernmental transfers on local public spending | Fixed effects Quantile Regression & Regression Discontinuity Design | ➢ Unconditional transfers promote higher spending that would otherwise cause an increase of income, supporting the flypaper effect. |
| **De Mello Jr. Luiz R. (2002)** | Brazilian municipalities (1985-1994) | Impact on growth of three spending categories with their corresponding sources of financing which include taxes, transfers and debt | Panel Fixed Effects | ➢ Growth depends upon the provision of public goods and services from the local community, therefore, each expenditure category should not be analysed in isolation but considering the financing mechanisms. |
| **Kappeler et al. (2013)** | 20 European countries at a local level (1990-2009) | Effect of revenue decentralization on the provision of public infrastructure | Corrected Least Square Dummy Variable and GMM | ➢ Tax shares increase public infrastructure at a sub-national level; additionally, investment grants increase investment at a local level which can be interpreted through the vision of a major autonomy of sub-national governments that would lead to major levels of public investment. |

| Author | Sample | Topics Analysed | Method | Main Results |
|---|---|---|---|---|
| **Lan and Sylwester (2010)** | China -27 provinces (1966-2003) | Fiscal Positions Business Cycles | Descriptive, Analytic, OLS & IV | ➢ Provinces with similar budgetary positions have similar business cycle movements |
| **Rodden and Wibbels (2010)** | 7 Federations (1968-2001) | Fiscal Decentralisation & Business Cycle | Descriptive, Analytic, Cross-Country & OLS | ➢ Sub-national governments have to work on their own when several shocks affect the development of their economies since own source taxes are pro-cyclical while revenue sharing and transfers behave either a-cyclical or pro-cyclical too<br>➢ Worldwide fiscal policies have a tendency towards applying countercyclical fiscal measures |
| **Blochliger et al (2010)** | 25 OECD (1980-2011) | Economic Crisis & Sub-Central Governments | Descriptive, Analytic & Cross-Country | ➢ The way that sub-central governments are affected by the global crises and their capacity to cope with the fiscal policy undertaken by their central governments becomes relevant for a nation's economic recovery<br>➢ Local governments seem to be less affected than central governments but in fact have to deal with higher spending and lower tax revenue, they can sometimes make their own plan for recovery but the appropriate coordination between intergovernmental entities becomes a key factor |
| **Binswanger-Mkhize H. et al. (2012)** | 241 villages representing 17 major states of India (1999&2006) | Impact of restricted and unrestricted fiscal grants on tax | 3SLS | ➢ Villages spend their resources according to their own local priorities, however, the impact of one Rupee of grants received with taxes raised in terms of time fetching water and days lost to illness, tax raised has less impact than grants received, therefore, the efficiency of grants is higher than own taxes. |

| Author | Sample | Topics Analysed | Method | Main Results |
|---|---|---|---|---|
| **Aida Caldera Sanchez (2013)** | Mexico (1989-2010) | Fiscal Federalism | Descriptive and FE | ➢ Transfers are highly volatile and have a destabilising effect regarding GDP fluctuations.<br>➢ In order to promote higher efficiency for intergovernmental transfer system in Mexican states and municipalities, a well-coordinated package of reforms needs to be implemented by improving transparency, spending responsibilities and establishing a harder budget constraint for each level of government. |
| **LABOUR MARKET** | | | | |
| **Dahlberg, M. et al. (2008) & Lundqvist, H. et al. (2014)** | 279 Swedish municipalities (1996–2004) | Impact of government transfers on different types of personnel employed by the sub-national governments | Regression Kink Design | ➢ Demonstrate that there is a large and positive effect of transfers on the number of employees in the central administration, but no effects in other sectors.<br>➢ Transfers do not stimulate local public employment but results remain positive and significant for administrative personnel.<br>➢ However, public funds targeted specifically at stimulating employment could have better results than the effect of unconditional transfers. |
| **Messing V. (2013)** | Five Countries of the EU | Labour Market Policies with an Impact Potential on Roma Employment | Cross-Country & Descriptive Analysis | ➢ Large scale untargeted activation and public employment programmes have reached most Roman population. Public work employment can be the only available source of employment to families in extreme poverty. In Slovakia and Bulgaria public employment is an active labour market measure, although welfare benefits are not tied to participation in public employment. |

## *3.3 Growth Methodologies*

### 3.3.1 Cross Section

It refers to an analysis of several variables of interest in a particular period of time, and for instance, it is very revealing that several of the studies done using local-level data, exploit this type of methodology. Perhaps they have been confronted with the problem of different accounting and reporting methodologies within the localities.

Benetrix and Lane (2010 p.6, 20) when analysing international differences in fiscal policy in 52 countries during the period between 2007 and 2009, considering country characteristics, develop a model as follows:

$$\Delta FBAL_i^* = \alpha_1 + \mu_1 GROW_i + \beta_1 X_i + \varepsilon_{1i} \quad (3.1)$$

where

$\Delta FBAL_i^*$ = Optimal Fiscal Balance of country i

$GROW_i$ = Growth of GDP

$X_i$ = A set of other potential determinants of the optimal fiscal response which include: unemployment rate, GDP pc, debt as percentage of GDP, level of trade openness, country size, exchange rate and level of international financial integration.

The cross-country configuration they apply seems to be useful in order to determine each country's fiscal position, growth and other factors that could affect fiscal variables, which in turn is important in order to draw some general conclusions of the application of fiscal policies across countries. Although the present study is interested in the particular characteristics of each locality, the development of income and expenditure variables may also vary across time, depending on regional and international economic conditions. Most prominently, the current study will focus on the disaggregated governmental income and expenditure variables simultaneously and their impact on GDP per capita. Furthermore, this study will concentrate on the relationship between

transfers and employment at a national, state and municipal level.

Cross Section methodology is useful in order to analyse different countries or localities development, but in itself lacks of the time variation component, which is pertinent for a comprehensive analysis of economic development in a dynamic context. Consequently, the current model will allow me to analyse each country's development considering both its idiosyncratic differences and the time variation in its economic data. A model which takes into consideration both component is the most suitable approach for the current analysis.

However, this work develops a social perspective of public finances, which refers to the perception "policy makers" have regarding different kinds of taxes levied and several types of expenditure utilised and their impact on GDP, according to a self-developed survey for this purpose. In addition, the current analysis will include the opinion people have of public services provided, considering the regional surveys provided by Latinobarómetro 2008-2010. The results of the above-mentioned questionnaires will surely enrich the overall development of this work by taking into account the opinion and expertise of public sector government officials in the 32 Mexican states and people's perception of governmental development in matter of public finance.

### 3.3.2 Quantile Regression

According to Colin Cameron, A. et al. (2009 p.213) these types of models are robust because they allow a better representation of the data by studying not only the full distribution but parts of it, at any particular percentile. Therefore, the function to be minimised is:

$$\beta_q = \sum_{i:j_i \geq x_i'\beta}^{N} q\left|y_i - x_i'\beta_q\right| + \sum_{i:j_i < x_i'\beta}^{N} (1-q)\left|y_i - x_i'\beta_q\right| \qquad (3.2)$$

Where 0<q<1 and $\beta_q$ refers to each percentile option.

Standard regressions utilise the relationship between the regressors and the dependent variable considering the conditional mean, however, the quantile regression employs the conditional median, where the median is the 50th percentile that splits the data into proportions q below and (1-q) above. As mentioned in the precedent paragraph, the quantile regression minimises de absolute deviations, the sum that gives asymmetric penalties for over and under prediction and makes an approximation to the function of the conditional distribution of the dependent variable. This type of regression is more robust to non-normal errors and outliers and it can give an insight of the tail distribution development (Cameron and Trivedi, 2005).

I apply this estimator at quantile 25 and 75 in our 2,247 municipalities in Mexico in order to demonstrate that inequality on income and expenditure is huge, even within the seven groups I have.

Durlauf et al. (2001 p.555) present evidence for country specific heterogeneity, particularly for developing countries. Therefore, when utilising quantile regression, it is possible to account for such heterogeneity in different segments of the conditional distribution. Mello and Perrelli (2003 p.643, 665) apply quantile growth regressions to several samples of OECD (21 and 24) and Non-OECD countries (30 and 80) during the period 1960-1998 and show that the effect of the control variables on growth varies significantly along the distribution. Concavity is positive in the lower quantiles and negative in the upper quantiles. Each quantile has a group response for GDP growth related to a change in a policy variable which captures the heterogeneity among countries. Coad and Rao (2006, p.6,7) develop a quantile regression to analyse the influence of innovation on the market value in 3,416,957 U.S. utility patents from 1963 to 2002 and find that the market value changes dramatically depending on the quantile of the distribution. Coad and Rao acknowledge that this type of estimation is effective in accounting for heterogeneity.

For instance, Ram (2008 p.387) finds that growth development varies across quantiles and there is a huge contrast between high and low quantiles. Lijuan Huo et al. (2015, p.3859) analyse economic growth convergence in 86 non-oil countries from 1960 to 2005 using quantile regression and find that the convergence speed depends on quantiles and it is higher either at the high or low quantiles.

Uddin et al. (2017, p.610, 614) investigate the effect of political stability on economic growth in 120 developing countries during 1996–2014. Their findings show that political instability affects growth more harshly in the lower and middle-income countries, perhaps due to the lack of robust economic and political institutions. Besides, political instability is higher in oil producing countries. When samples have countries with different levels of development and background (high heterogeneity), the assumption of normal distribution does not apply and quantile regression results are more robust.

Several regression methods utilise the relationship between the conditional mean of the explanatory variables and the outcome variable, however, the quantile regression allows the possibility of analysing the relationship in different points of the distribution of the dependent variable, and is particularly effective when data is highly heterogenous. In this respect, median regression is more robust than least squares regression and allows a more in-depth and detailed analysis of the data when it presents high variability (Koenker, 2017, p.20).

## *3.4 Fiscal Policy Mix Municipality Analysis*

### 3.4.1 Fiscal policy model, methodology and data

My empirical analysis considers a range of disaggregated income and expenditure variables in Mexico in 2,247 municipalities from 1994 to 2010. My period of study begins in 1994 in order to be comparable with the interpretation made of Mexican states, although the same criteria applies regarding the

beginning of NAFTA to develop my research and it ends in 2010 as a consequence of the regulation change in the General Accounting Law. My work suggests that income and expenditure components should be taken into account simultaneously, when evaluating changes in GDP per capita growth. In order to test my hypothesis, I run regressions considering income or expenditure components separately and then together (detailed in the appendix) and my findings show that there is a difference between the coefficients in all three regressions with slightly more significant coefficients in my broader model.

In light of Gemmell et al´s (2012) Budget Government Constraint Model, following the same procedure as I did in my previous chapter, with the limitation of the data available at the municipal level, which have a broader classification, I develop a more in-depth analysis considering 7 groups of municipalities according to their level of development as it will be explained later in this section. The group classification is conducted by the Mexican National Institute of Statistics and Geography and I only utilise the same criteria to group the municipalities I have in my data set. The municipalities I have in my sample are the ones which have available income and expenditure data for my period of study.

I apply a fixed effects panel data and afterwards I utilise my baseline specification model, allowing for cross sectional dependence in my dataset. Furthermore, in order to be able to analyse the differences within each group, I develop quantile 25 and 75 regressions. The Stata commands I use are “xtreg”, “xtscc” and “sqreg”. The specification tests are preceding each regression. I provide evidence demonstrating that income and expenditure components should be analysed simultaneously when evaluating changes in GDP per capita growth, considering the main income and expenditure components. In order to test my hypothesis, I run regressions with income or expenditure components separately and then together (detailed in the appendix) and my findings show that there is a difference between the coefficients in all three regressions with slightly more significant coefficients in my broader model.

## Fiscal Policy Model

The empirical analysis uses annual data of 2,274 Mexican municipalities from 1994 to 2010. The fiscal policy variables included are taxes, non-earmarked transfers, acquisition of movable and immovable goods, public infrastructure and other expenditure (for definitions, descriptive statistics and sources of these variables, see Tables 3.5-3.7). The control variables in the case of provinces are piped water systems, drainage and sewerage systems, users of public institutions, length of road network, tourists, electric energy users and high school index.

## Regression equation

In this thesis in order to properly analyse fiscal variables, the estimation equation is as follows:

$$\Delta Y_{i,t} = \propto_i + \theta_1 Y_{i,t-1} + \beta_1 (R)_{i,t-1} + \beta_2 (E)_{i,t-1} + \theta_2 X_{it-1} + l_{i,t} + y_{i,t} + u_{i,t} \quad (3.3)$$

Where:

| | |
|---|---|
| i | = province |
| t | = time |
| $\propto_i$ | = Fixed effect for each locality i |
| Y | = GDP per capita level |
| R | = Taxes and non-earmarked transfers as a share of total revenue |
| E | = Acquisition of movable and immovable goods, public infrastructure and other expenditure as a share of total expenditure |

X = Control variables (Piped water systems, Drainage and sewerage system, users of public institutions, length of road network, tourists, electric energy users and high school index)

lit = Locality fixed effects component

yit = Year fixed effects component

The main hypothesis is:

$$\Delta X_{it} = f(R_{it-1}, E_{it-1}, X_{it-1}) \quad (3.4)$$

The main income and expenditure components should be considered when analysing the development of GDP per capita.

Additionally, this study will analyse employment and its correlation with transfers and taxes levied as follows:

$$L^E{}_{i,t} = \propto_i + \theta_1 Y_{i,t-1} + \beta_1 (R)_{i,t-1} + \beta_2 (E)_{i,t-1} + \theta_2 X_{it-1} + l_{i,t} + y_{i,t} + u_{i,t} \quad (3.5)$$

Where

$L^E$ = Rate of formal employment in locality i at time t

## Sources and properties of the data

In the case of Mexican Municipalities, the classification is done according to 27 indicators that describe their socioeconomic characteristics regarding education, health, employment and urbanisation. I just followed the same classification that is commonly used by the Mexican Institute of Statistics and Geography in my dataset.

The indicators considered were:

- Infrastructure: population with water services, electricity and sewage.
- Quality of Housing: population with housing made of dissolved material, rock, brick, quarry, cement or others.
- Overcrowding: occupants per room and population without overcrowding.
- Housing equipment: population with sanitary service, electricity, gas, refrigerator, television, telephone and automobile.
- Health: children alive from women between 20 and 34, population entitled to health services (total, women, younger than 18 and older than 65).
- Education: literate (15, between 15 and 65), children between 6 and 14 who goes to school, population between 12 and 17 that goes to school, population over 15 with post-primary education, average education for population above 15.
- Employment: working population between 20 and 49, female occupation, population which work without payment, population which works in tertiary activities.
- Income: working population per 100 inhabitants, working population that earns more than two and a half minimum wages, population that earns more than five minimum salaries, population that earn more than 10.42 pesos per household.

This methodology is applied by the Mexican National Statistics Institute considering the Mexican Census of Population and Employment 2000. In this case, seven groups are constructed; Group 1 represents the municipalities where there is less relative advantage of socioeconomic development and Group 7 stands for localities with the higher relative advantage compared to the other groups. In my case, the database is original and is constructed by merging 32 state databases, and afterwards applying the Mexican National Statistics Institute methodology of classification.

# Table 3.5 Descriptive Statistics Municipalities

| Variable | Definition | Mean | Std. Dev. | CV | Source |
|---|---|---|---|---|---|
| **Dependent variables** | | | | | |
| **Employment rate** | Annual growth of formally employed workers as percentage of total population | 0.17 | 0.53 | 310.80 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **Gross revenue per capita growth** | Annual real gross municipality revenue per capita growth in percentage | 0.15 | 0.59 | 383.38 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **Fiscal policy variables** | | | | | |
| **Aquisition of movable and immovable goods** | Aquisition of movable&immovable goods as percentage of total municipality expenditure, multiplied by 100 | 2.56 | 4.55 | 178.10 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **Earmarked transfers** | Earmarked (conditional) transfers as percentage of total municipality income, multipied by 10 | 2.48 | 2.30 | 93.01 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **Non-earmarked transfers** | Non-earmarked (unconditional) transfers as percentage of total municipality income, multiplied by 10 | 5.47 | 2.40 | 43.89 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **Public infrastructure** | Public infrastructure as percentage of total municipality expenditure, multiplied by 10 | 2.76 | 1.84 | 66.44 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **Taxes** | Taxes as percentage of total municipality income, multiplied by 100 | 4.40 | 6.10 | 138.71 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **Control variables** | | | | | |
| **Death of infants < 1 year** | Death of infants under one year, divided by 100 | 0.32 | 2.13 | 672.33 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **Drainage and sewerage system** | Systems utilised for drainage and sewage per capita | 0.26 | 0.53 | 206.76 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **Electric energy users** | Tourists at lodging establishments, divided by 100,000 | 0.26 | 0.13 | 49.04 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **High school index** | High school achievment index , divided by 10 | 5.50 | 3.25 | 59.03 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **Length of road network** | Real square meters constructed, divided by 1,000 | 0.36 | 1.65 | 456.84 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **New trucks sold** | Users of electric energy as percentage of total population | 0.40 | 2.29 | 565.89 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **Piped water systems** | Systems utilised for piped water per capita | 0.91 | 1.17 | 128.60 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **Total area sown** | Acres sown, divided y 10,000 | 2.26 | 11.65 | 514.93 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **Tourists** | New trucks sold to the public, multiplied by 1,000 | 1.00 | 5.08 | 508.25 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |
| **Users public institutions** | Population entitled to social security as percentage of total population | 0.83 | 0.67 | 80.59 | National Institute of Statics and Geography, INEGI (2014); author's calculations. |

## Table 3.6 Descriptive Statistics Municipalities by Group (cont.)

| | Group 1 | | | Group 2 | | | Group 3 | | | Group 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variable | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV |
| **Dependent variables** | | | | | | | | | | | | |
| Employment rate | 0.01 | 0.25 | 2038.21 | 0.03 | 0.21 | 635.37 | 0.02 | 0.53 | 3214.61 | 0.18 | 0.18 | 103.82 |
| Gross revenue per capita growth | 0.29 | 1.01 | 343.90 | 0.21 | 0.71 | 336.52 | 0.15 | 0.50 | 341.93 | 0.10 | 0.37 | 358.33 |
| **Fiscal policy variables** | | | | | | | | | | | | |
| Aquisition of movable and immovable goods | 3.10 | 6.11 | 196.96 | 3.22 | 6.38 | 198.47 | 2.21 | 4.00 | 180.83 | 2.54 | 3.51 | 138.13 |
| Earmarked transfers | 3.17 | 3.12 | 98.19 | 2.65 | 2.58 | 97.51 | 2.73 | 2.43 | 88.99 | 2.22 | 1.73 | 77.88 |
| Non-earmarked transfers | 5.32 | 3.18 | 59.64 | 5.80 | 2.74 | 47.17 | 5.72 | 2.47 | 43.25 | 5.55 | 1.81 | 32.59 |
| Public infrastructure | 3.53 | 2.32 | 65.72 | 3.20 | 1.97 | 61.65 | 3.03 | 1.79 | 58.98 | 2.20 | 1.44 | 65.31 |
| Taxes | 1.15 | 3.27 | 284.72 | 1.61 | 2.97 | 184.38 | 2.54 | 3.61 | 141.94 | 4.93 | 4.99 | 101.31 |
| **Control variables** | | | | | | | | | | | | |
| Death of infants < 1 year | 0.20 | 1.44 | 728.52 | 0.26 | 2.26 | 855.98 | 0.19 | 1.31 | 686.86 | 0.42 | 4.39 | 1046.24 |
| Drainage and sewerage system | 0.10 | 0.24 | 239.42 | 0.19 | 0.42 | 219.02 | 0.22 | 0.39 | 180.10 | 0.92 | 1.07 | 115.77 |
| Electric energy users | 0.16 | 0.17 | 102.29 | 0.23 | 0.16 | 70.78 | 0.25 | 0.11 | 45.72 | 0.33 | 0.12 | 35.31 |
| High school index | 5.44 | 3.70 | 68.05 | 5.03 | 3.80 | 75.47 | 5.58 | 3.30 | 59.20 | 4.89 | 3.61 | 73.87 |
| Length of road network | 0.80 | 3.48 | 433.61 | 0.47 | 1.95 | 417.24 | 0.30 | 1.22 | 408.58 | 0.39 | 1.55 | 396.47 |
| New trucks sold | 0.02 | 0.17 | 994.46 | 0.03 | 0.29 | 889.59 | 0.02 | 0.24 | 967.60 | 0.09 | 0.55 | 640.18 |
| Piped water systems | 1.05 | 1.18 | 112.50 | 1.27 | 1.37 | 107.56 | 0.90 | 0.93 | 102.61 | 1.46 | 1.82 | 124.56 |
| Total area sown | 3.05 | 17.58 | 575.69 | 2.15 | 12.55 | 583.14 | 2.06 | 10.87 | 526.93 | 3.08 | 11.99 | 389.53 |
| Tourists | 0.43 | 3.95 | 920.76 | 0.42 | 4.65 | 1096.55 | 0.39 | 3.07 | 794.77 | 1.32 | 6.42 | 485.85 |
| Users public institutions | 0.78 | 0.48 | 62.36 | 0.82 | 0.56 | 68.10 | 0.83 | 0.49 | 58.33 | 0.86 | 0.40 | 47.21 |

a ) Group classification was done according to municipalities socioeconomic characteristics and considering the Mexican Census of Population and Employment 2000, where Group 1 is the least developed and Group 7 is the most developed.

b ) Non classified group belongs to the municipalities that did not have the 27 indicators that described their socioeconomic characteristics regarding education, health, employment and urbanization.

## Table 3.7 Descriptive Statistics Municipalities by Group (End)

| | Group 5 | | | Group 6 | | | Group 7 | | | Non Classified | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variable | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV |
| **Dependent variables** | | | | | | | | | | | | |
| Employment rate | 0.21 | 0.61 | 290.07 | 0.31 | 0.79 | 259.17 | 0.68 | 0.51 | 73.99 | 0.17 | 0.53 | 310.80 |
| Gross revenue per capita growth | 0.13 | 0.49 | 375.32 | 0.09 | 0.40 | 442.73 | 0.07 | 0.26 | 385.69 | 0.15 | 0.59 | 383.38 |
| **Fiscal policy variables** | | | | | | | | | | | | |
| Aquisition of movable and immovable goods | 2.16 | 3.37 | 155.87 | 2.24 | 3.03 | 135.14 | 2.62 | 3.63 | 138.54 | 2.56 | 4.55 | 178.10 |
| Earmarked transfers | 2.40 | 2.10 | 87.39 | 1.96 | 1.58 | 81.00 | 1.64 | 1.32 | 80.13 | 2.48 | 2.30 | 93.01 |
| Non-earmarked transfers | 5.62 | 2.19 | 39.01 | 5.12 | 1.81 | 35.32 | 4.24 | 1.53 | 36.24 | 5.47 | 2.40 | 43.89 |
| Public infrastructure | 2.76 | 1.64 | 59.57 | 2.03 | 1.41 | 69.39 | 1.94 | 1.30 | 67.14 | 2.76 | 1.84 | 66.44 |
| Taxes | 4.66 | 5.55 | 119.04 | 8.16 | 6.85 | 83.97 | 14.82 | 9.00 | 60.72 | 4.40 | 6.10 | 138.71 |
| **Control variables** | | | | | | | | | | | | |
| Death of infants < 1 year | 0.26 | 1.05 | 411.39 | 0.33 | 1.47 | 451.08 | 1.11 | 1.51 | 135.83 | 0.32 | 2.13 | 672.33 |
| Drainage and sewerage system | 0.16 | 0.23 | 141.17 | 0.25 | 0.40 | 163.26 | 0.06 | 0.09 | 161.73 | 0.26 | 0.53 | 206.76 |
| Electric energy users | 0.25 | 0.10 | 41.09 | 0.28 | 0.10 | 36.39 | 0.29 | 0.07 | 25.11 | 0.26 | 0.13 | 49.04 |
| High school index | 5.92 | 2.65 | 44.76 | 5.63 | 2.91 | 51.67 | 6.26 | 1.58 | 25.20 | 5.50 | 3.25 | 59.03 |
| Length of road network | 0.34 | 1.77 | 521.59 | 0.27 | 1.26 | 469.81 | 0.30 | 0.58 | 194.09 | 0.36 | 1.65 | 456.84 |
| New trucks sold | 0.22 | 1.03 | 479.59 | 0.86 | 4.24 | 495.13 | 3.77 | 5.09 | 134.98 | 0.40 | 2.29 | 565.89 |
| Piped water systems | 0.54 | 0.58 | 106.93 | 0.40 | 0.59 | 147.97 | 0.11 | 0.14 | 121.97 | 0.91 | 1.17 | 128.60 |
| Total area sown | 2.14 | 11.45 | 534.41 | 1.95 | 9.61 | 493.25 | 1.52 | 3.22 | 210.92 | 2.26 | 11.65 | 514.93 |
| Tourists | 1.01 | 5.22 | 514.72 | 2.09 | 7.18 | 343.47 | 5.41 | 6.46 | 119.55 | 1.00 | 5.08 | 508.25 |
| Users public institutions | 0.83 | 0.63 | 76.25 | 0.83 | 1.16 | 139.35 | 0.90 | 0.46 | 50.84 | 0.83 | 0.67 | 80.59 |

a ) Group classification was done according to municipalities socioeconomic characteristics and considering the Mexican Census of Population and Employment 2000, where Group 1 is the least developed and Group 7 is the most developed.

b ) Non classified group belongs to the municipalities that did not have the 27 indicators that described their socioeconomic characteristics regarding education, health, employment and urbanization.

### 3.4.2 Growth

In this section, the proposed panel data model is applied to the 2,247 municipalities in Mexico from 1994 to 2010, with the aim of determining the fiscal policy mix during the period of study and its impact on economic development. This empirical estimation analyses the development of Real Gross Revenue per capita as a function of taxes, transfers and capital expenditures and a set of control variables such as: drainage and sewage systems, piped water systems, users of public institutions of social security and assistance, length of the road network, tourists who stayed at lodging establishments, electric energy users and high school achievement index.

My estimations for municipalities are done considering panel fixed effects and afterwards the cross-sectional dependence estimator which allows me to account for autocorrelation and cross-sectional dependence (Table 3.11). Furthermore, Quantile regressions give me an insight to understand the disparities at a subnational level between the seven groups of localities (Table 3.12). The specification tests are shown in Tables 3.8-3.10. My panel is unbalanced and my relevant variables are stationary and don´t present problems of collinearity.

De Mello (2002, p.1871, 1881, 1882, 1877) estimate the impact on growth on Brazilian municipalities from 1985-1994 of three spending categories with their corresponding sources of financing which include taxes, transfers and debt. The study concludes that growth depends upon the provision of public goods and services from the local community, therefore, each expenditure category should not be analysed in isolation but considering the financing mechanisms. In my study, I find that diverse types of infrastructure have a different impact at a municipal level. Moreover, as a proxy for municipal output De Mello utilises tax revenue and state GDP per capita. In my model, I use total gross revenue per capita as a proxy for GDP per capita. I also estimated all my regressions

considering state GDP per capita as a dependent variable, however, results were not robust, perhaps because of the huge disparities among localities.

The impact of taxes on real gross revenue per capita growth is positive and significant in groups 3, 4, 6 and 7. This result could be explained through the mechanism of central government transfers, since the formula of distribution of transfers takes into account the effort local entities make to collect own source revenue, regardless of the tax effects per se. However, it is interesting to observe that again, taxes in developed localities show a positive relationship with growth, which is consistent with my results in the previous chapter, where indirect taxes were positive and significant only in more developed states. Unfortunately, I was unable to have access to a broader classification of income and expenditure variables at a municipal level. Local finances in Mexico are opaque and although the General Government Accounting Law was last amended in December 2015 in order to promote accounting harmonization between the three levels of government, little has been done in this respect, therefore, accountability and transparency of public funds remains an issue. Likewise, when I consider quantile regression I can see that the effect of taxes on more developed localities is positive and significant while in less developed is not. By comparing the 25 with the 75-quantile regression within the same groups, I observe a positive and significant effect on groups 2, 3, 4, 6 and 7 on quantile 25 while in quantile 75 it is only positive and significant in groups 4, 6 and 7. These results would indicate that inequality persists even among the same group.

Carnavire-Bacarreza et al. (2013, p.28) study taxation and economic growth in Latin America at a country level between 1990 and 2010, finding that personal income tax does not seem to have any effect on growth, however, corporate income tax displays a positive and significant effect on growth in this region. Moreover, J. Alm and Rogers (2011, p.483) use local data of 48 states in USA from 1947 to 1997 to estimate the effects of taxes, among other factors, on economic growth and find that the effect of taxation policies depend upon the

regressors, the estimation method and the time period. Besides, their results demonstrate that there is no convergence in state per capita income.

In the case of central government transfers, my study finds that non-conditional transfers have a positive and significant effect on growth in all groups with the exception of group 5 (Table 3.11). The impact of unconditional transfers on groups 3, 4, 5, 6 and 7 is positive and significant on quantile 25 and only remains positive and significant in group 4 and 7 in quantile 75 (Table 3.12). Again, the positive effect of transfers can be seen, mainly in the low-income segment, who receives a higher amount of transfers compared with the high-income segment. Mainly these results are consistent with Cullis et al. (2009) reflecting higher levels of growth when higher level of unconditional transfers is allocated to local governments. The same pattern was observed in Mexican states.

Arvate et al. (2013 p.1) when analysing Brazilian municipalities find that transfers have a higher impact on local spending than on income, but local expenditure is more elastic to non-conditional transfers than to conditional transfers. Moreover, González (2010, p.19) finds that conditional transfers enhance public investment in 15 oldest members of EU from 1993-2005. Overall, in the case of Mexican municipalities, it seems that unconditional transfers reflect on higher levels on local growth in the less developed localities.

According to Coneval (2011) no systematic evaluation and analysis of Branch 33 (earmarked transfers) exists, information is heterogeneous and clear and specific objectives should be designed. Many localities don't have the financial capacity to undertake these type of tasks, however, simple controls should be implemented to be able to track the use of these resources. The implementation of suitable indicators that allow the adequate evaluation of Branch 33 funds should be considered. The aforementioned study recognizes that the resources canalised through Brach 33 do not reflect adequately the requirements of particular localities. Abud and Rodriguez (2012) show that GDP per capita at a

state level is negatively correlated with the efficiency of earmarked transfers. Ramírez (2013) states the importance of controls in the three level of governments in order to adequately coordinate efforts to canalize Branch 33 resources efficiently. Therefore, the resources of Branch 33 should not follow inertial patterns from historic trends but Human Development Index, locality needs and measurable achievements in local tax collection. Pöschl (2015) developed a case study for 6 Mexican municipalities finding that there was substantial scope for increasing property tax, however, Majors preferred to motivate people who evaded tax and encouraged them to pay with a discount on fines of past indebtedness. Majors looked for all potential sources of financing, however, they highly relied on transfers from the federal government in order to operate. She finds that accountable and transparent Municipalities have higher prospect of tax collection. Moreover, since the Mexican Constitution does not allow re-election of Municipal Majors, local administrations are reluctant to raise their own source revenues.

Public Infrastructure is negative and significant for groups 2, 4 and 5, while Acquisition of Movable and Immovable Goods is not significant in any group when I apply cross sectional dependence estimator (Table 3.11). The effect of other expenditure is not significant in any group as well. With respect to quantile regression (Table 3.12), the effect of Public Infrastructure is negative and significant for group 1 and 4, but positive and significant only in group 3 and in the case of Acquisition of Movable and Immovable Goods, the effect is not significant in any group. The effect of other expenditure is negative and significant only in group 2 while positive and significant in group 5 and 7. The impact on growth when taking into consideration different lags, can be quite different and particularly between heterogeneous Mexican municipalities. Unfortunately, the definition of public infrastructure and the acquisition of movable and immovable goods at a Municipal level is very general and different types of infrastructure are pooled within the same category, which could partially explain the lack of significance of these variables. Regional studies on public investment lack of consistency and there is a wide variation on public capital stock, different capacity and quality of public infrastructure, as well as a complex

process of interdependency where capital is not perfectly mobile across regions, however, the importance of public infrastructure in stimulating economic development has been recognized among economists by enhancing the productivity of private inputs or increasing output (Eberts, 1990). When I did my analysis considering different lags, the significance of my fiscal variables of interest was different for each group at different time periods. These results are consistent with Devarajan et al. (1996) that find that the relationship between government capital expenditure and growth is negative in developing countries due to misallocations of public spending.

Turning to other regressors, I find that drainage and sewerage and users of public institutions is positive and significant only for group 7; length of road network is positive and significant for groups 4 and 6, high school achievement index is negative and significant for group 1 and positive and significant for group 3; tourism has a negative and significant coefficient for groups 2 and 3 but positive and significant for group 5; electric energy users are only positive and significant for group 5.

In this respect, benefits from public investment would have to exceed its costs, but most likely highways and water distribution and treatment facilities would provide a net positive effect on productivity (Eberts, 1990). García-Mila and McGuire (1987) find a positive and significant effect of education and highway expenditures to GDP at a local level in US from 1970 to 1983. In my study, less developed localities present negative and significant coefficients for tourist and education components but when measuring those variables in more developed localities they turn to be positive and significant. Consistent with my findings, Hansen (1965) finds that less developed localities are categorised by a low standard of living, small firms and industries, therefore public infrastructure would have modest impact.

Consequently, the task of properly canalising resources to a particular expenditure within different municipalities is not straightforward. A unique generalised formula for municipality's development cannot be derived. As I have seen, the Mexican Inter-governmental framework is highly centralised and a high amount of local resources derive from state and federal shares and contributions; however, a more accurate legislation to acknowledge local responsibilities on federal resources and formulas which properly recognise disparities among localities, need to be considered to promote growth and overcome regional inequalities. If the lack of transparency remains in the use of resources, localities will utilise public funds in a discretionary way.

## Table 3.8 Fisher Unit Root Test

| Unit Root Test | I chi-squared | p-value |
|---|---|---|
| Growth | 10063.14 | 0.00 |
| Tax | 15352.48 | 0.00 |
| Non-earmarked transfers | 6207.94 | 0.00 |
| Aquisition of movable and immovable goods | 8739.25 | 0.00 |
| Public infrastructure | 5353.09 | 0.00 |
| Other expenditure | 8430.53 | 0.00 |
| Piped water systems | 10803.60 | 0.00 |
| Drainage and sewerage system | 280.08 | 1.00 |
| Users public institutions | 8613.76 | 0.00 |
| Length of road network | 7464.78 | 0.00 |
| Tourists | 4091.36 | 0.00 |
| Electric energy users | 5548.08 | 0.00 |
| High school index | 4128.16 | 0.00 |

## Table 3.9 Heteroskesdasticity Test by Groups

| Test | Value | p-value |
|---|---|---|
| Group 1 | 3.00E+31 | 0.00 |
| Group 2 | 9.80E+32 | 0.00 |
| Group 3 | 4.00E+05 | 0.00 |
| Group 4 | 7.70E+04 | 0.00 |
| Group 5 | 2.42E+04 | 0.00 |
| Group 6 | 1.43E+04 | 0.00 |
| Group 7 | 3.76E+03 | 0.00 |

## Table 3.10 Collinearity Test

| | Collinearity statistics | |
|---|---|---|
| VARIABLES | Tolerance | VIF |
| Tax | 0.65 | 1.54 |
| Non-earmarked transfers | 0.43 | 2.32 |
| Aquisition of movable and immovable goods | 0.96 | 1.04 |
| Public infrastructure | 0.54 | 1.86 |
| Other expenditure | 0.94 | 1.07 |
| Piped water systems | 0.77 | 1.30 |
| Drainage and sewerage system | 0.79 | 1.26 |
| Users public institutions | 0.92 | 1.09 |
| Length of road network | 0.56 | 1.78 |
| Tourists | 0.49 | 2.04 |
| Electric energy users | 0.84 | 1.19 |
| High school index | 0.92 | 1.08 |

## Table 3.11 Growth Regression considering Cross Sectional Dependence for Municipalities in Mexico 1994-2010

| Groups | (Group 1) | | (Group 2) | | (Group 3) | | (Group 4) | | (Group 5) | | (Group 6) | | (Group 7) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variables | Fixed effects | Discroll and Kraay | Fixed effects | Discroll and Kraay | Fixed effects | Discroll and Kraay | Fixed effects | Discroll and Kraay | Fixed effects | Discroll and Kraay | Fixed effects | Discroll and Kraay | Fixed effects | Discroll and Kraay |
| **Fiscal policy variables** | | | | | | | | | | | | | | |
| **Revenue** | | | | | | | | | | | | | | |
| Tax | 2.01 | 2.01 | 5.47*** | 5.47 | 3.51*** | 3.51** | 5.35*** | 5.35** | 0.03 | 0.03 | 0.73** | 0.03 | 1.70*** | 1.70* |
| | (1.31) | (1.33) | (0.95) | (4.75) | (0.85) | (1.57) | (1.51) | (2.22) | (0.27) | (0.27) | (0.32) | (0.27) | (0.46) | (0.85) |
| Non-earmarked transfers | 9.34*** | 9.34*** | 4.72*** | 4.72*** | 6.57*** | 6.57** | 8.22*** | 8.22*** | 2.11 | 2.11 | 9.00*** | 2.11 | 7.41*** | 7.41*** |
| | (2.22) | (2.98) | (1.64) | (1.38) | (1.86) | (2.92) | (2.98) | (1.51) | (1.51) | (2.72) | (1.53) | (2.72) | (2.48) | (1.63) |
| **Expenditure** | | | | | | | | | | | | | | |
| Aquisition of movable and immovable goods | -0.60 | -0.60 | -0.40 | -0.40 | -0.23 | -0.23 | 5.68*** | 5.68 | -0.13 | -0.13 | -0.43 | -0.13 | -0.54 | -0.54 |
| | (0.74) | (0.70) | (0.66) | (0.56) | (0.72) | (0.66) | (0.76) | (4.57) | (0.53) | (0.56) | (0.39) | (0.56) | (0.40) | (0.34) |
| Public infrastructure | -4.40** | -4.40 | -3.12* | -3.12* | -0.77 | -0.77 | -7.39** | -7.39*** | -2.00 | -2.00* | -3.09** | -2.00* | -1.74 | -1.74 |
| | (2.00) | (2.58) | (1.64) | (1.75) | (1.77) | (2.14) | (2.92) | (2.44) | (1.31) | (1.07) | (1.25) | (1.07) | (2.11) | (1.92) |
| Other expenditure | 5.63** | 5.63 | -0.18 | -0.18 | -1.85 | -1.85 | -4.21 | -4.21 | 4.36*** | 4.36 | 3.14 | 4.36 | -4.24 | -4.24 |
| | (2.59) | (3.70) | (2.01) | (2.38) | (2.24) | (3.44) | (5.28) | (3.80) | (1.51) | (4.08) | (1.99) | (4.08) | (3.63) | (8.97) |
| **Control variables** | | | | | | | | | | | | | | |
| Fiscal reform | 28.60** | 28.60*** | 11.61 | 11.61 | 13.62 | 13.62*** | 61.02*** | 61.02*** | 2.64 | -52.89 | 34.58*** | -52.89 | 37.53*** | -11.53 |
| | (12.25) | (4.42) | (9.63) | (6.83) | (9.80) | (4.40) | (21.11) | (8.43) | (6.41) | (42.80) | (7.65) | (42.80) | (12.69) | (90.28) |
| Recession dummy | 62.11*** | 27.50 | 26.75* | 26.75** | 17.00 | 8.85 | -34.00* | -18.61 | 5.02 | 5.02 | 16.23* | 5.02 | 6.89 | 6.89 |
| | (22.35) | (20.08) | (14.33) | (12.30) | (13.49) | (15.68) | (17.42) | (12.00) | (9.61) | (8.95) | (8.33) | (8.95) | (12.93) | (6.68) |
| Piped water systems | 0.76 | 0.76 | 3.36 | 3.36 | -1.44 | -1.44 | -4.69 | -4.69 | 0.15 | 0.15 | -14.09 | 0.15 | 27.60 | 27.60 |
| | (3.21) | (1.18) | (3.88) | (2.76) | (3.20) | (1.57) | (6.40) | (3.74) | (4.84) | (3.39) | (11.29) | (3.39) | (76.77) | (50.78) |
| Drainage and sewerage system | 22.37 | 22.37 | 4.55 | 4.55 | -18.50 | -18.50 | 0.76 | 0.76 | 12.74 | 12.74 | 7.94 | 12.74 | 86.41 | 86.41* |
| | (15.93) | (15.63) | (18.43) | (10.50) | (12.31) | (10.73) | (9.60) | (4.78) | (13.80) | (10.22) | (21.85) | (10.22) | (65.30) | (44.71) |
| Users public institutions | 11.35 | 11.35 | 12.13** | 12.13 | 8.75 | 8.75 | 5.83 | 5.83 | 2.37 | 2.37 | 9.12 | 2.37 | 13.39 | 13.39** |
| | (10.78) | (8.60) | (5.85) | (9.20) | (8.29) | (8.34) | (8.29) | (5.95) | (4.26) | (2.07) | (6.65) | (2.07) | (9.81) | (6.11) |
| Length of road network | -1.29 | -1.29 | -1.48 | -1.48 | -3.73 | -3.73 | 4.53 | 4.53** | -0.60 | -0.60 | 0.91 | -0.60 | -22.95 | -22.95 |
| | (4.78) | (3.06) | (2.23) | (0.85) | (4.03) | (2.24) | (6.93) | (1.61) | (1.84) | (0.68) | (1.10) | (0.68) | (19.39) | (14.65) |
| Tourists | 0.22 | 0.22 | -0.45 | -0.45** | -0.62 | -0.62* | -0.24 | -0.24 | -0.55 | -0.55 | 1.04 | -0.55 | 0.03 | 0.03 |
| | (1.02) | (1.18) | (0.61) | (0.20) | (1.74) | (0.33) | (0.74) | (0.46) | (0.69) | (0.39) | (0.76) | (0.39) | (0.61) | (0.40) |
| Electric energy users | 1.60 | 1.60 | -4.35 | -4.35 | 0.20 | 0.20 | -4.05 | -4.05 | 38.18 | 38.18** | -0.46 | 38.18** | -39.28 | -39.28 |
| | (12.20) | (5.24) | (13.42) | (10.29) | (23.56) | (18.05) | (51.36) | (22.29) | (25.05) | (14.53) | (29.34) | (14.53) | (92.73) | (42.42) |
| High school index | -1.63* | -1.63*** | -0.66 | -0.66 | 1.16 | 1.16** | -0.20 | -0.20 | 0.27 | 0.27 | 1.25 | 0.27 | 0.28 | 0.28 |
| | (0.94) | (0.53) | (0.83) | (0.69) | (0.95) | (0.46) | (1.22) | (0.50) | (0.79) | (0.76) | (1.04) | (0.76) | (2.19) | (1.73) |
| Observations | 542 | 542 | 766 | 766 | 816 | 816 | 654 | 654 | 552 | 552 | 390 | 390 | 308 | 308 |
| Number of municipalities | 78 | 78 | 99 | 99 | 123 | 123 | 100 | 100 | 83 | 83 | 71 | 71 | 48 | 48 |
| R - squared | 0.526 | 0.526 | 0.418 | 0.418 | 0.331 | 0.331 | 0.204 | 0.204 | 0.397 | 0.397 | 0.423 | 0.423 | 0.216 | 0.216 |
| F - statistic | 17.94 | 19103 | 17.06 | 60540 | 12.23 | 11225 | 4.993 | 294.3 | 10.76 | 168999 | 7.944 | 1737 | 2.371 | 1201 |

Notes: Dependent variable is real gross revenue per capita annual percentage growth rate. All explanatory variables are lagged by one year. Annual data for 1994-2010. Group classification was done according to municipalities socioeconomic characteristics where Group 1 is the least developed and Group 7 is the most developed. All regressions also contain year dummies. SE are reported in parentheses. The estimators used are Fixed Effects and the Discroll and Kraay (1998) which accounts for fixed cross-sectional effects, autocorrelation, heteroskedasticity and cross sectional dependence. ***(**/*) denotes statistically significant at the 1%(5%/10%) level.

## Table 3.12 Growth Regression considering Simultaneous Quantiles for Municipalities in Mexico 1994-2010

| VARIABLES | (Group 1) | | (Group 2) | | (Group 3) | | (Group 4) | | (Group 5) | | (Group 6) | | (Group 7) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Quantile | | Quantile | | Quantile | | Quantile | | Quantile | | Quantile | | Quantile | |
| | 25th | 75th | 25th | 75th | 25th | 75th | 25th | 75th | 25th | 75th | 25th | 75th | 25th | 75th |
| **Fiscal policy variables** | | | | | | | | | | | | | | |
| Tax | 0.48 | 0.42 | 1.04*** | 0.46 | 0.60** | -0.03 | 1.21*** | 0.98*** | 0.13 | 0.07 | 0.48** | 0.57* | 0.45** | 0.52** |
| | (0.59) | (1.36) | (0.35) | (0.47) | (0.28) | (0.29) | (0.31) | (0.31) | (0.24) | (0.23) | (0.23) | (0.31) | (0.21) | (0.26) |
| Non-earmarked transfers | 1.36 | 0.09 | 1.18 | 1.08 | 3.03*** | 1.21 | 3.87*** | 3.58*** | 2.21** | 0.32 | 3.69*** | 2.71* | 3.79** | 2.07 |
| | (1.27) | (1.43) | (0.85) | (1.20) | (0.60) | (0.92) | (0.80) | (0.91) | (1.01) | (0.85) | (1.25) | (1.45) | (1.47) | (2.04) |
| **Expenditure** | | | | | | | | | | | | | | |
| Aquisition of movable and immovable goods | -0.41 | -0.25 | 0.20 | 0.92 | 0.11 | -0.47 | -0.18 | -0.08 | 0.30 | -0.22 | -0.17 | -0.14 | -0.46 | -0.20 |
| | (0.25) | (0.25) | (0.27) | (0.64) | (0.29) | (0.37) | (0.29) | (0.44) | (0.37) | (0.45) | (0.47) | (0.50) | (0.62) | (0.65) |
| Public infrastructure | -0.30 | -2.35* | 0.71 | -1.06 | 1.33* | -0.02 | -1.38* | -1.78 | -0.09 | -1.07 | -1.17 | -0.97 | 0.09 | -0.90 |
| | (0.65) | (1.29) | (0.63) | (0.79) | (0.79) | (0.66) | (0.72) | (1.43) | (1.04) | (0.99) | (0.85) | (1.06) | (0.76) | (1.28) |
| Other expenditure | 0.88 | 1.85 | 1.59 | -2.54* | 1.24 | 0.41 | -2.68 | -2.12 | 5.73*** | -0.07 | 1.63 | 2.01 | 3.70 | 4.51 |
| | (1.21) | (2.48) | (1.13) | (1.46) | (1.45) | (1.31) | (2.14) | (2.39) | (1.47) | (1.38) | (2.10) | (1.61) | (2.42) | (3.85) |
| **Control variables** | | | | | | | | | | | | | | |
| Fiscal reform | 3.68 | 8.78 | 4.32 | 6.01 | 1.73 | 5.76 | 24.33** | 60.73*** | 6.11** | -0.39 | 15.48* | 13.61* | 7.67 | 12.21 |
| | (7.97) | (9.49) | (4.77) | (4.92) | (3.24) | (8.00) | (10.40) | (9.69) | (2.92) | (6.74) | (8.89) | (8.01) | (10.05) | (9.09) |
| Recession dummy | -17.83** | -20.74* | -13.15** | -7.37 | -19.68*** | -21.36* | -25.51** | -54.05*** | -19.10*** | -22.85** | -13.89*** | -17.03** | -5.57 | 2.32 |
| | (8.00) | (11.65) | (5.23) | (6.14) | (6.20) | (11.56) | (11.46) | (11.29) | (6.31) | (10.68) | (4.95) | (7.81) | (10.56) | (9.13) |
| Piped water systems | -0.24 | -0.66 | -0.05 | 1.01 | 0.42 | -1.08 | -2.46*** | -0.82 | -0.12 | -1.11 | -2.45 | -0.53 | -10.83 | -21.19 |
| | (0.68) | (1.04) | (1.07) | (1.67) | (0.73) | (0.99) | (0.81) | (0.83) | (1.48) | (2.40) | (2.62) | (3.60) | (12.31) | (16.37) |
| Drainage and sewerage system | 1.47 | 4.75 | -2.21 | -1.03 | 0.40 | -1.39 | 0.37 | -0.67 | 2.18 | 1.81 | 2.46 | -0.92 | 10.48 | 27.87* |
| | (3.72) | (5.29) | (2.74) | (5.11) | (2.35) | (3.79) | (0.62) | (0.68) | (3.94) | (5.76) | (3.35) | (5.88) | (13.07) | (15.76) |
| Users public institutions | -0.09 | -2.40 | 3.96** | 7.24** | 0.92 | -0.96 | 1.62 | 0.73 | -0.91 | -0.23 | 2.03 | -0.22 | 2.91 | -1.27 |
| | (3.26) | (4.63) | (1.62) | (3.17) | (2.24) | (1.86) | (1.47) | (2.84) | (2.26) | (2.18) | (2.55) | (2.33) | (2.94) | (4.77) |
| Length of road network | -0.37 | 0.38 | -0.87 | -0.21 | 0.43* | -0.32 | -0.15 | -0.41 | -0.68 | 0.47 | 0.64* | -0.65 | 1.73 | -1.18 |
| | (0.56) | (0.90) | (0.57) | (0.39) | (0.23) | (0.37) | (0.32) | (0.27) | (0.83) | (0.59) | (0.37) | (0.57) | (1.63) | (1.53) |
| Tourists | 0.25 | -0.26 | 0.13 | -0.08 | -0.04 | 0.23 | -0.31** | -0.06 | 0.38 | -0.28 | -0.10 | 0.01 | -0.12 | 0.18 |
| | (0.45) | (0.54) | (0.08) | (0.05) | (0.22) | (0.19) | (0.15) | (0.15) | (0.32) | (0.32) | (0.13) | (0.12) | (0.20) | (0.22) |
| Electric energy users | 0.69 | 1.29 | -2.84 | -4.00 | 4.37 | -5.92 | -3.04 | 1.70 | 9.62 | 9.72 | 2.07 | -12.75 | -1.79 | -36.64 |
| | (3.76) | (7.18) | (10.52) | (4.91) | (5.55) | (6.95) | (5.55) | (11.82) | (11.66) | (14.53) | (8.20) | (11.19) | (35.57) | (31.70) |
| High school index | 0.32 | 0.36 | 0.20 | -0.18 | 0.58* | -0.16 | 0.29 | -0.20 | 0.69** | -0.34 | 1.01 | 0.13 | 1.13 | 0.11 |
| | (0.23) | (0.44) | (0.18) | (0.48) | (0.34) | (0.30) | (0.41) | (0.61) | (0.30) | (0.45) | (0.71) | (0.87) | (0.85) | (0.99) |
| Observations | 542 | 542 | 766 | 766 | 816 | 816 | 654 | 654 | 552 | 552 | 390 | 390 | 308 | 308 |
| Sum of absolute desviations | 5581 | 5581 | 7541 | 7541 | 7635 | 7635 | 4179 | 4179 | 3675 | 3675 | 2142 | 2142 | 1542 | 1542 |
| Sum of raw desviations | 8568 | 8568 | 10701 | 10701 | 10338 | 10338 | 5123 | 5123 | 5158 | 5158 | 2831 | 2831 | 1866 | 1866 |
| Quantile 75th | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Sum of absolute desviations | 4243 | 4243 | 5815 | 5815 | 5628 | 5628 | 3074 | 3074 | 3108 | 3108 | 1786 | 1786 | 1271 | 1271 |
| Sum of raw desviations | 5554 | 5554 | 6938 | 6938 | 6743 | 6743 | 3738 | 3738 | 4232 | 4232 | 2323 | 2323 | 1594 | 1594 |
| Quantile 25th | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| Residual Degrees of Freedom | 514 | 514 | 738 | 738 | 788 | 788 | 626 | 626 | 524 | 524 | 362 | 362 | 280 | 280 |

Notes: Dependent variable is real gross revenue per capita annual percentage growth rate. All explanatory variables are lagged by one year. Annual data for 1994-2010. Group classification was done according to municipalities socioeconomic characteristics where Group 1 is the least developed and Group 7 is the most developed. All regressions also contain year dummies. Standard errors are reported in parentheses. ***(**/*) denotes statistically significant at the 1%(5%/10%) level.

### 3.4.3 Employment

In this section, the proposed panel data model is applied to the 2,247 municipalities in Mexico from 1994 to 2010, with the aim of determining the fiscal policy mix during the period of study and its impact on formal employment. This empirical estimation analyses the development of formal employment as a function of taxes, transfers and capital expenditure and a set of control variables such as: drainage and sewage systems, piped water systems, length of the road network, new trucks sold to the public and high school achievement index.

My estimations for municipalities are done considering panel fixed effects and then using cross-sectional dependence computation which allowed me to account for autocorrelation and cross-sectional dependence (Table 3.16). Furthermore, Quantile regressions give me the opportunity to understand the disparities at a subnational level between localities with different development (Table 3.17). The specification tests are shown in Tables 3.13-3.15.

The impact of taxes on formal employment rate is positive and significant in groups 1, 2, 3 and 5 when considering cross sectional dependence estimator. As discussed earlier, taxes collected by the local governments are taken into consideration when transfers from the central government are distributed, as a signal of reflecting local effort on revenue collection. This circumstance might be the reason for the positive effect. These results are also consistent with my state analysis and perhaps the income effect is higher than the substitution effect in less developed localities. Conversely, when I consider Quantile regressions, I find a negative and significant effect only in group 3. The limitation of availability of data at a local level in Mexico, constitutes a major drawback for the development of this thesis.

My cross sectional dependence estimations (Table 3.16) reflect that the effect of transfers on employment is positive and significant for groups 2 and 3. However, quantile regressions (Table 3.17) show a negative and significant effect in groups 1, 4 and 6, however, the effect is positive and significant in groups 5 and 7. Overall, it seems that transfers have a negative influence on employment, which could be an indicator that grants are not being allocated efficiently and also do not seem to play a significant role in promoting employment at a local level. Municipalities that have higher degree of poverty, receive more resources from earmarked transfers, since these types of transfers have a general purpose of equalising regional disparities, however the amount of resources canalised to these localities does not reflect in better local performance.

When I analyse the development of Public Infrastructure results are positive and significant for groups 1 and 3 with cross sectional dependent estimator (Table 3.16). However, results are negative and significant for groups 1, 2, 3, 4, 5 and 6 but other expenditure presents positive and significant coefficients for groups 2 and 4 when analysing Quantile regressions (Table 3.17). These results are puzzling; however, informal economy plays a significant role in the Mexican economy, therefore, the real effect on the economy cannot possibly be captured by formal employment figures.

Turning to the control variables utilised, I find mixed effects among high and low-income localities for drainage, sewerage and piped water systems, however the effect of length of the road network is positive for all groups except for group 6. new trucks sold to the public is positive and significant for groups 2, 4, 5, 6 and 7, but negative and significant for group 3. High school achievement index is negative for groups 1, 2 and 7 but positive and significant for groups 3, 4 and 6. As explained earlier in this chapter, regional studies on public investment lack of consistency and there is a wide variation on capacity and quality of public infrastructure.

Consequently, the task of properly canalising resources to a particular activity in order to enhance higher levels of employment within different municipalities is not up-front.

## Table 3.13 Fisher Unit Root Test

| Unit Root Test | I chi-squared | p-value |
|---|---|---|
| Employment rate | 5141.71 | 0.00 |
| Tax | 15353.12 | 0.00 |
| Non-earmarked transfers | 6207.94 | 0.00 |
| Aquisition of movable and immovable goods | 8739.25 | 0.00 |
| Public infrastructure | 5353.09 | 0.00 |
| Other expenditure | 8430.53 | 0.00 |
| Piped water systems | 8846.43 | 0.00 |
| Drainage and sewerage system | 7758.20 | 0.00 |
| Length of road network | 5620.56 | 0.00 |
| New trucks sold | 808.02 | 1.00 |
| High school index | 9278.66 | 0.00 |

## Table 3.14 Heteroskesdasticity Test by Groups

| Test | Value | p-value |
|---|---|---|
| Group 1 | 2.40E+32 | 0.00 |
| Group 2 | 9.40E+32 | 0.00 |
| Group 3 | 8.70E+33 | 0.00 |
| Group 4 | 6.40E+33 | 0.00 |
| Group 5 | 1.00E+34 | 0.00 |
| Group 6 | 2.90E+34 | 0.00 |
| Group 7 | 2.80E+32 | 0.00 |

## Table 3.15 Collinearity Test

| | Collinearity statistics | |
|---|---|---|
| VARIABLES | Tolerance | VIF |
| Tax | 0.68 | 1.47 |
| Non-earmarked transfers | 0.51 | 1.98 |
| Aquisition of movable and immovable goods | 0.96 | 1.04 |
| Public infrastructure | 0.60 | 1.67 |
| Other expenditure | 0.92 | 1.09 |
| Piped water systems | 0.85 | 1.18 |
| Drainage and sewerage system | 0.88 | 1.13 |
| Length of road network | 0.95 | 1.05 |
| New trucks sold | 0.86 | 1.16 |
| High school index | 0.89 | 1.12 |

## Table 3.16 Employment Regression considering Cross Sectional Dependence for Municipalities in Mexico 1994-2010

| Groups | (Group 1) | | (Group 2) | | (Group 3) | | (Group 4) | | (Group 5) | | (Group 6) | | (Group 7) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variables | Fixed effects | Discroll and Kraay | Fixed effects | Discroll and Kraay | Fixed effects | Discroll and Kraay | Fixed effects | Discroll and Kraay | Fixed effects | Discroll and Kraay | Fixed effects | Discroll and Kraay | Fixed effects | Discroll and Kraay |
| **Fiscal policy variables** | | | | | | | | | | | | | | |
| **Revenue** | | | | | | | | | | | | | | |
| Tax | 9.23** | 9.23*** | 8.87 | 8.87* | 8.58 | 8.58*** | -21.90* | -21.90 | 19.23 | 19.23* | 7.97 | 19.23* | 7.41 | 7.41 |
| | (4.05) | (2.35) | (5.70) | (4.80) | (6.08) | (2.54) | (12.41) | (13.61) | (13.97) | (9.42) | (25.48) | (9.42) | (30.43) | (32.56) |
| Non-earmarked transfers | 1.69* | 1.69 | 0.94 | 0.94** | 7.67* | 7.67*** | -3.87 | -3.87 | -0.41 | -0.41 | -9.56 | -0.41 | -32.29** | -32.29 |
| | (0.88) | (1.10) | (0.58) | (0.37) | (3.91) | (2.20) | (2.87) | (3.74) | (8.47) | (5.36) | (8.36) | (5.36) | (12.93) | (20.91) |
| **Expenditure** | | | | | | | | | | | | | | |
| Aquisition of movable and immovable goods | -3.53 | -3.53 | 1.61 | 1.61 | 1.46 | 1.46 | 25.76** | 25.76 | 15.83 | 15.83 | -18.99 | 15.83 | -14.13 | -14.13 |
| | (2.46) | (2.84) | (1.85) | (1.18) | (13.15) | (4.98) | (10.75) | (25.24) | (18.75) | (15.55) | (25.60) | (15.55) | (32.34) | (15.92) |
| Public infrastructure | 1.25** | 1.25* | 0.13 | 0.13 | 8.54** | 8.54** | 9.18*** | 9.18 | -7.47 | -7.47 | -0.85 | -7.47 | -14.97 | -14.97 |
| | (0.62) | (0.63) | (0.69) | (0.38) | (4.20) | (3.98) | (3.31) | (12.34) | (8.57) | (8.58) | (9.39) | (8.58) | (13.93) | (8.58) |
| Other expenditure | -0.89 | -0.89 | 0.59 | 0.59 | -7.26*** | -7.26*** | -7.35* | -7.35 | -15.90** | -15.90 | -12.75 | -15.90 | -6.00 | -6.00 |
| | (0.69) | (0.79) | (0.41) | (0.63) | (2.67) | (1.99) | (4.29) | (5.59) | (7.92) | (9.15) | (10.68) | (9.15) | (16.20) | (26.59) |
| **Control variables** | | | | | | | | | | | | | | |
| Fiscal reform | 0.01** | 0.01*** | 0.01** | 0.01*** | 0.10** | 0.10*** | 0.21*** | 0.24*** | 0.19*** | 0.19*** | 0.24*** | 0.19*** | 0.12* | 0.12*** |
| | (0.00) | (0.00) | (0.00) | (0.00) | (0.04) | (0.01) | (0.04) | (0.01) | (0.06) | (0.01) | (0.05) | (0.01) | (0.06) | (0.02) |
| Recession dummy | 0.00 | 0.00 | -0.01 | 0.00 | -0.04 | -0.04*** | -0.24*** | -0.24*** | -0.11** | -0.11*** | -0.31*** | -0.11*** | -0.28*** | -0.28*** |
| | (0.00) | (0.00) | (0.02) | (0.00) | (0.05) | (0.01) | (0.04) | (0.02) | (0.05) | (0.02) | (0.06) | (0.02) | (0.06) | (0.03) |
| Piped water systems | 1.91 | 1.91* | 1.81 | 1.81** | -2.47 | -2.47 | 10.10** | 10.10 | 29.20* | 29.20** | 59.63 | 29.20** | 242.86 | 242.86** |
| | (1.91) | (0.96) | (1.21) | (0.83) | (3.36) | (2.92) | (4.72) | (7.54) | (14.94) | (13.68) | (38.88) | (13.68) | (229.89) | (112.60) |
| Drainage and sewerage system | -23.67*** | -23.67*** | -4.70* | -4.70* | -2.81 | -2.81 | -11.59 | -11.59 | -216.62** | -216.62** | 32.18 | -216.62** | 213.72 | 213.72 |
| | (5.19) | (7.34) | (2.40) | (2.26) | (10.61) | (12.17) | (8.35) | (14.71) | (82.92) | (88.72) | (52.37) | (88.72) | (207.91) | (183.56) |
| Length of road network | 2.76 | 2.76 | 0.39 | 0.39 | -1.26 | -1.26 | -3.33 | -3.33 | -0.50 | -0.50 | 0.20 | -0.50 | -41.45 | -41.45 |
| | (3.79) | (1.83) | (1.90) | (2.13) | (4.45) | (2.62) | (28.39) | (13.53) | (1.96) | (2.66) | (2.89) | (2.66) | (57.96) | (24.05) |
| New trucks sold | 3.78 | 3.78 | 13.18 | 13.18*** | -7.03 | -7.03 | 16.70** | 16.70*** | -3.77 | -3.77 | 28.45** | -3.77 | 1.34 | 1.34 |
| | (10.23) | (6.27) | (10.84) | (2.78) | (12.93) | (9.76) | (7.55) | (3.24) | (8.22) | (7.83) | (14.32) | (7.83) | (5.93) | (2.23) |
| High school index | -0.45** | -0.45** | -0.77** | -0.77*** | -2.73 | -2.73* | -1.10 | -1.10 | 2.51 | 2.51 | 2.43 | 2.51 | 7.60 | 7.60 |
| | (0.22) | (0.19) | (0.34) | (0.12) | (2.23) | (1.55) | (1.48) | (2.39) | (3.84) | (2.48) | (5.76) | (2.48) | (13.76) | (22.77) |
| Observations | 659 | 659 | 787 | 787 | 849 | 849 | 1,975 | 1,975 | 619 | 619 | 1,346 | 1,346 | 537 | 537 |
| Number of municipalities | 56 | 56 | 94 | 94 | 128 | 128 | 208 | 208 | 100 | 100 | 207 | 207 | 78 | 78 |
| R - squared | 0.163 | 0.163 | 0.0981 | 0.0981 | 0.104 | 0.104 | 0.193 | 0.193 | 0.129 | 0.129 | 0.139 | 0.139 | 0.120 | 0.120 |
| F - statistic | 364.2 | 5226 | 5.851 | 528.1 | 2.065 | 111603 | 4.278 | 62815 | 4.973 | 38068 | 3.518 | 2730 | 3.006 | 14015 |

Notes: Dependent variable is employment rate. All explanatory variables are lagged by one year. Annual data for 1994-2010. Group classification was done according to municipalities socioeconomic characteristics where Group 1 is the least developed and Group 7 is the most developed. All regressions also contain year dummies. SE are reported in parentheses. The estimators used are Fixed Effects and the Discroll and Kraay (1998) which accounts for fixed cross-sectional effects, autocorrelation, heteroskedasticity and cross sectional dependence. ***(**/*) denotes statistically significant at the 1%(5%/10%) level.

## Table 3.17 Employment Regression considering Simultaneous Quantiles for Municipalities in Mexico 1994-2010

| VARIABLES | (Group 1) | | (Group 2) | | (Group 3) | | (Group 4) | | (Group 5) | | (Group 6) | | (Group 7) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Quantile | | Quantile | | Quantile | | Quantile | | Quantile | | Quantile | | Quantile | |
| | 25th | 75th | 25th | 75th | 25th | 75th | 25th | 75th | 25th | 75th | 25th | 75th | 25th | 75th |
| **Fiscal policy variables** | | | | | | | | | | | | | | |
| Tax | 0.14 | -3.52 | 0.12 | -8.99 | -5.84*** | -51.92** | 13.25 | -18.20 | 8.41 | -51.63 | 8.61 | 50.68*** | -27.06 | 19.46 |
| | (0.10) | (10.54) | (0.13) | (6.53) | (1.71) | (23.59) | (13.09) | (17.28) | (14.24) | (43.88) | (12.43) | (17.26) | (19.85) | (20.29) |
| Non-earmarked transfers | -0.02 | -3.46*** | 0.01 | -2.22* | -0.73 | -2.24 | -10.12*** | -14.01*** | 13.13 | 35.44* | -26.45*** | 8.84 | 9.32 | 35.85*** |
| | (0.06) | (0.88) | (0.03) | (1.20) | (0.51) | (6.80) | (1.89) | (3.88) | (8.33) | (18.84) | (6.90) | (6.70) | (15.83) | (12.98) |
| **Expenditure** | | | | | | | | | | | | | | |
| Aquisition of movable and immovable goods | 0.07 | -1.47 | -0.15 | -1.93 | -1.71 | -31.16 | -5.34 | 4.58 | 14.08 | -70.87 | -62.61* | -27.02 | -28.50 | -7.42 |
| | (0.10) | (1.92) | (0.11) | (2.43) | (1.69) | (36.15) | (8.09) | (14.41) | (27.54) | (86.61) | (36.07) | (43.79) | (59.90) | (21.40) |
| Public infrastructure | -0.09* | -2.21** | -0.09** | -2.88** | -1.54** | 0.05 | -9.62*** | -17.49*** | -12.59** | -28.67** | -16.85*** | -7.64 | -15.46* | -6.33 |
| | (0.05) | (1.12) | (0.04) | (1.38) | (0.60) | (6.26) | (1.70) | (4.73) | (6.00) | (12.13) | (6.16) | (7.10) | (8.36) | (15.21) |
| Other expenditure | 0.02 | 0.80 | 0.07 | 1.98* | 1.21* | 3.87 | 16.17*** | 18.07** | 14.86 | -19.53 | -0.19 | 19.87** | 34.90 | -14.48 |
| | (0.04) | (0.72) | (0.06) | (1.03) | (0.69) | (8.54) | (3.72) | (7.60) | (11.20) | (47.47) | (18.10) | (8.12) | (45.30) | (17.39) |
| **Control variables** | | | | | | | | | | | | | | |
| Fiscal reform | -0.00 | -0.00 | -0.00** | -0.00 | -0.00 | 0.05 | 0.03** | 0.79*** | 0.06 | 0.06 | 0.13** | 0.42*** | 0.03 | 0.05 |
| | (0.00) | (0.01) | (0.00) | (0.00) | (0.01) | (0.11) | (0.01) | (0.25) | (0.04) | (0.13) | (0.05) | (0.05) | (0.08) | (0.09) |
| Recession dummy | 0.00 | 0.00 | -0.00 | -0.00 | -0.00 | -0.12 | -0.02 | -0.75*** | -0.05 | -0.21*** | -0.22*** | -0.43*** | -0.47*** | -0.13** |
| | (0.00) | (0.01) | (0.00) | (0.00) | (0.00) | (0.10) | (0.02) | (0.26) | (0.04) | (0.08) | (0.05) | (0.05) | (0.14) | (0.06) |
| Piped water systems | 0.10 | 2.53*** | 0.10** | 0.74 | 0.16 | -14.42** | -5.54*** | -22.33*** | -29.42* | 110.80 | 4.84 | 30.60 | -396.92** | -104.25 |
| | (0.07) | (0.90) | (0.05) | (1.52) | (0.40) | (7.02) | (1.07) | (1.77) | (17.82) | (77.62) | (14.84) | (28.41) | (161.21) | (81.27) |
| Drainage and sewerage system | 0.55 | 24.65*** | 0.62** | 10.84** | -0.16 | 15.28 | -11.34*** | -12.68*** | -247.20*** | -928.95*** | -7.90 | -62.83** | 410.45 | 643.11*** |
| | (0.60) | (8.58) | (0.30) | (4.59) | (1.37) | (16.13) | (2.18) | (4.39) | (54.97) | (223.94) | (18.82) | (31.57) | (255.73) | (63.15) |
| Length of road network | 11.06*** | 17.29*** | 16.88*** | 30.94*** | 48.24*** | 55.30*** | 17.97*** | 17.33*** | 19.59*** | 11.37** | 8.36* | -0.65 | 36.83** | -23.19*** |
| | (1.48) | (1.38) | (5.32) | (6.79) | (4.18) | (7.41) | (3.54) | (4.31) | (6.14) | (5.62) | (4.46) | (7.26) | (16.59) | (6.84) |
| New trucks sold | -15.07 | -14.76 | 78.67*** | 102.44*** | -63.41*** | -63.93 | 60.79*** | 73.62*** | 71.30*** | 81.67*** | 27.47** | 45.75*** | 3.10 | 17.64** |
| | (19.61) | (31.75) | (16.72) | (25.72) | (24.53) | (49.89) | (8.39) | (14.34) | (14.06) | (30.00) | (12.75) | (5.58) | (6.22) | (6.90) |
| High school index | -0.01 | -0.28 | -0.05*** | 0.16 | 0.24 | 3.36 | 2.98*** | 4.69*** | 4.70 | -51.32*** | 18.11*** | 1.55 | -9.91 | -21.68*** |
| | (0.01) | (0.18) | (0.02) | (0.28) | (0.15) | (4.25) | (0.80) | (1.29) | (4.13) | (16.94) | (2.47) | (5.60) | (10.62) | (7.99) |
| Observations | 659 | 659 | 787 | 787 | 849 | 849 | 1,975 | 1,975 | 619 | 619 | 1,346 | 1,346 | 537 | 537 |
| Sum of absolute desviations | 7.13 | 7.13 | 9.97 | 9.97 | 44.26 | 44.26 | 101.20 | 101.20 | 68.89 | 68.89 | 121.70 | 121.70 | 48.98 | 48.98 |
| Sum of raw desviations | 14.08 | 14.08 | 30.62 | 30.62 | 57.12 | 57.12 | 130.80 | 130.80 | 88.06 | 88.06 | 135.40 | 135.40 | 55.51 | 55.51 |
| Quantile 75th | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Sum of absolute desviations | 3.22 | 3.22 | 5.38 | 5.38 | 22.79 | 22.79 | 74.48 | 74.48 | 45.16 | 45.16 | 111.90 | 111.90 | 46.48 | 46.48 |
| Sum of raw desviations | 4.81 | 4.81 | 10.21 | 10.21 | 28.23 | 28.23 | 86.73 | 86.73 | 55.54 | 55.54 | 128.40 | 128.40 | 53.82 | 53.82 |
| Quantile 25th | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.250 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| Residual Degrees of Freedom | 633 | 633 | 761 | 761 | 823 | 823 | 1949 | 1949 | 593 | 593 | 1320 | 1320 | 511 | 511 |

Notes: Dependent variable is employment rate. All explanatory variables are lagged by one year. Annual data for 1994-2010. Group classification was done according to municipalities socioeconomic characteristics where Group 1 is the least developed and Group 7 is the most developed. All regressions also contain year dummies. Standard errors are reported in parentheses. ***(**/*) denotes statistically significant at the 1%(5%/10%) level.

### 3.4.4 Conclusion

Intergovernmental relationships in Mexico are complex and heterogeneity and inequality is spread all over Mexican territory. Localities could initiate changes to improve their tax system by taking advantage of their potential taxing power and focusing in the transparency and accountability of public funds. Develop their competitive advantage and promote investment and employment in priority areas in the region.

**Growth**

The impact of taxes on real gross revenue per capita growth is positive and significant in most of the groups. This result could be explained through the mechanism of central government transfers, since the formula of distribution of transfers takes into account the effort local entities make to collect own source revenue, regardless of the tax effects per se. According to the classification I have for municipalities, no distinction is made between direct and indirect taxes, but certainly at lower levels of income the positive effect could also be explained by the income effect.

In the case of central government transfers, my study finds that non-conditional transfers have a positive and significant effect on Municipalities. My results are consistent with Cullis et al. (2009) findings and with state development figures explained in my previous chapter when analysing state development by group.

Unfortunately, the definition of public infrastructure and the acquisition of movable and immovable goods at a Municipal level is very general and different types of infrastructure are pooled within the same category, which could partially explain the lack of significance of these variables.

Turning to other regressors, public infrastructure has a modest impact on growth on less developed localities (Hansen, 1965). However, public inputs enter to the production of a locality as elements that increase productivity of private inputs (Eberts, 1990). Looney and Frederiksen (1981), in their study of Mexico, find that public investment is an initiating factor in the local development process.

**Employment**

The impact of taxes on formal employment rate is positive and significant in groups less developed localities. As discussed earlier, taxes collected by the local governments are taken into consideration when transfers from the central government are distributed, as a signal of reflecting local effort on revenue collection. Another explanation, as expressed in previous sections is that the income effect dominates the substitution effect in less developed localities.

My cross-sectional dependence estimations reflect that the effect of transfers on employment is mixed but as it has been discussed in my work, corruption, the opaque administration of public funds and data availability is a great drawback for the development of this thesis.

When I analyse capital expenditure, my results are mixed among localities but the informal economy and the bidding for the completion of public works is complex and sometimes lacks of transparency, situation that can lead to corruption and fraud, therefore, the real effect on the economy cannot possibly be captured by formal employment figures.

Turning to the control variables utilised, I find modest effects for less developed localities but positive outcomes for more developed municipalities. However, as discussed earlier in this chapter, regional studies on public investment lack of

consistency and there is a wide variation on capacity and quality of public infrastructure.

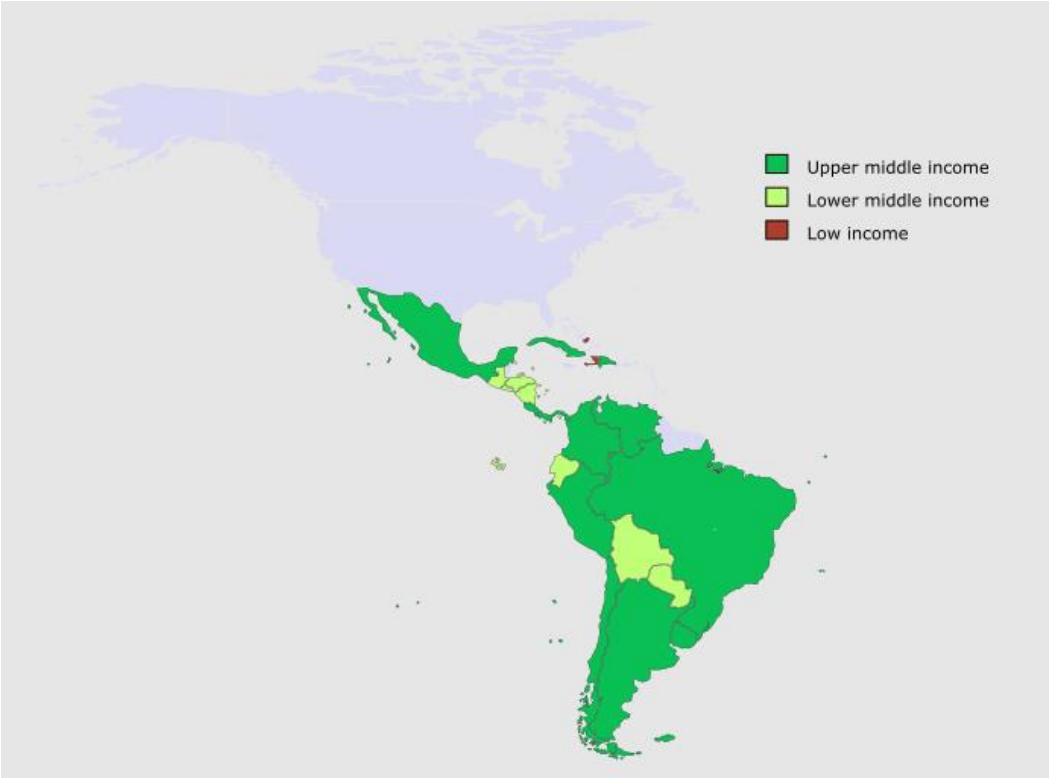
Consequently, the task of properly canalising resources to a particular expenditure within different municipalities is not straightforward. A unique generalised formula for municipality's development cannot be derived. Furthermore, my results illustrate disparities among localities between groups but also within groups, therefore, policymakers when implementing a fiscal policy measure need to consider the particular regional context in order to promote growth, employment and overcome local inequalities. If the lack of transparency remains in the use of resources, municipalities will utilise public funds in a discretionary way.

# 4. Latin America

## *4.1 Fiscal Panorama of Latin America*

Countries in the region with low debt have been able to use their fiscal space to boost investment. During the last decade, income derived from non-renewal natural resources was a key element of sound public finances in the region, however, the lower prices observed since mid-2014 makes it necessary to revisit and strengthen revenue from other sources of income (ECLAC, 2015). Four priority areas should be enhanced to increase revenue in Latin America: combat tax evasion, increase direct taxes, green taxes and tax some financial activities in the global economy; however, efforts to simplify the tax regime and administration should continue to minimize evasion or avoidance. The distributive impact of fiscal policy should be addressed considering that Latin America is among the most unequal regions in the world; consolidate the recovery of social spending, better targeting and stabilise the sources of financing; as well as recognize the effects of decentralization in terms of equity. Structural fragility of public finances in Latin America, reflects the weakness of fiscal policy management and administration. However, it is important to recognize that the attainment of the goal of equity, faces some friction with macroeconomic fiscal consolidation. There is huge complexity and difficulty of performing deep fiscal reforms to realign the fiscal instruments available for the realization of social rights and reduce structural weakness of public finances. Over the last decade, there has been an effort in the region to improve the situation of public finances by implementing fiscal rules that affect spending, the debt or budget balance.

**Figure 4.1 Latin American countries analysed**




Source: http://data.worldbank.org/products/wdi-maps

Especially when reviewing the structure and composition of tax revenue it is noteworthy that the countries of Central America and Mexico are characterized by a low proportion of these revenues to GDP, around 13% on average for the 1995-2012 period, compared with the average recorded for Latin America 16%, which contrasts to OECD countries, where income tax accounts for over 40% of revenue (Villagómez, 2014).

**Table 4.1 Latin America: Corporate Income Tax 2012**

| Country | Rate<br>% of tax income | Minimum tax (2010) |
|---|---|---|
| Argentina | 35.00% | 1.0%, over gross assets |
| Bolivia | 25.00% | No |
| Brazil | 34.00% | No |
| Chile | 20.00% | No |
| Colombia | 33.00% | 3% over net wealth |
| Costa Rica | 30.00% | No |
| Ecuador | 25.00% | No |
| El Salvador | 30.00% | 1% over gross income |
| Guatemala | 31.00% | 1% over 25% of net assets or 25% over gross assets |
| México | 30.00% | 17.5% over cash income 1/ |
| Panamá | 27.00% | 25% of net taxable income or 4.67% of gross taxable income |
| Perú | 30.00% | 0.4% over net assets |
| Uruguay | 25.00% | 1.5% to 3.5% over net wealth |
| Venezuela | 34.00% | No |
| | | |
| Average | 31.00% | |
| Maximum rate | 35.00% | Argentina |
| Minimum rate | 20.00% | Chile |
| Standard deviation | 4.30% | |

Source: Modified version of Amieva Huerta (2015, p.24).
1/ Repealed in 2013.

In Table 4.1 note that Argentina had the maximum 35% rate, while the lowest Chile had the minimum 17% (18.5% by 2012), in contrast to the rate of Mexico 30%, which was slightly lower than the average of countries in the region. However, corporate taxes in Mexico are in line with those of several countries in the region such as Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Panama, Peru, Uruguay and Venezuela. However, some of these countries used, in addition, a minimum tax or control.

**Table 4.2 Latin America: Top Personal Income Tax Rates**

| Country | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|
| Argentina | 35.00% | 35.00% | 35.00% | 35.00% |
| Brasil | 27.50% | 27.50% | 27.50% | 27.50% |
| Chile | 40.00% | 40.00% | 40.00% | 40.00% |
| Colombia | 33.00% | 33.00% | 33.00% | 33.00% |
| Ecuador | 35.00% | 35.00% | 35.00% | 35.00% |
| Jamaica* | 25.00% | 25.00% | 35.00% | 25.00% |
| México | 28.00% | 28.00% | 30.00% | 30.00% |
| Panamá | 27.00% | 27.00% | 25.00% | 25.00% |
| Uruguay | 25.00% | 25.00% | 25.00% | 25.00% |
| Venezuela | 34.00% | 34.00% | 34.00% | 34.00% |
| Average | 31.00% | 31.00% | 32.00% | 31.00% |
| Maximum rate (Chile) | 40.00% | 40.00% | 40.00% | 40.00% |
| Minimum rate (Uruguay) | 25.00% | 25.00% | 25.00% | 25.00% |
| Standard deviation | 0.05 | 0.05 | 0.05 | 0.05 |

* Jamaica is a Carribbean country
Source: Modified version of Amieva Huerta (2015, p.31).

Table 4.2 presents the maximum rates for the personal income tax for a sample of Latin American countries. Chile applied the maximum 40% rate, while Uruguay had the lowest rate with 25%. During the period 2008 to 2011 only Mexico and Jamaica made modifications to their tax rates. The average income tax for the Latin American countries was 31%, much less than that for the OECD countries of 41.5%. The standard deviations were 0.05 and 0.11, respectively in both samples.

As shown in table 4.3, Brazil was the first country in the Western hemisphere to introduce VAT in January 1967, while Uruguay was the second incorporation to its tax structure in 1968. During the seventies Argentina, Bolivia, Chile, Colombia, Costa Rica, Ecuador, Honduras, Nicaragua, Panamá and Peru implemented it. Mexico introduces it until January 1980, with a rate of introduction of 10%.

**Table 4.3 Latin America: VAT taxes**

| Country | Date of Introduction | General rate | Rate June 2013 | Other rates |
|---|---|---|---|---|
| Argentina | Jan. 1975 | 16.00% | 21.00% | 10.50%, 27.00% |
| Belice | Jul. 2006 | 10.00% | 12.50% | |
| Bolivia | Oct. 1973 | 10.00% | 13.00% | |
| Brasil | Jan. 1967 | 17.60% | 17.00% | 7.00%, 12.00%, 18.00% |
| Chile | Mar. 1975 | 20.00% | 19.00% | |
| Colombia | Jan. 1975 | 10.00% | 16.00% | 5.00% |
| Costa Rica | Jan. 1975 | 10.00% | 13.00% | 5.00%, 10.00% |
| Dominican R. | Mar. 2006 | 15.00% | 15.00% | 10.00% |
| Ecuador | Jul. 1970 | 4.00% | 12.00% | |
| El Salvador | Sep. 1992 | 10.00% | 13.00% | |
| Guatemala | Ago. 1983 | 7.00% | 12.00% | |
| Haití | Nov. 1982 | 7.00% | 10.00% | |
| Honduras | Jan. 1976 | 3.00% | 12.00% | 15.00%, 18.00% |
| Jamaica* | Oct. 1991 | 10.00% | 16.50% | 10.00%, 20.00%, 22.50% |
| México | Jan. 1980 | 10.00% | 16.00% | 11.00% |
| Nicaragua | Jan. 1975 | 6.00% | 15.00% | 7.00% |
| Panamá | Mar. 1977 | 5.00% | 7.00% | 10.00% 15.00% |
| Paraguay | Jul. 1993 | 12.00% | 10.00% | 5.00% |
| Perú | Jan. 1973 | 20.00% | 18.00% | |
| Uruguay | Jan. 1968 | 14.00% | 22.00% | |
| Venezuela | Oct. 1993 | 10.00% | 12.00% | 10.00% |
| Average | | 11.40% | 14.30% | |
| Maximum rate | Chile | 20.00% | 22.00% | Uruguay |
| Minimum rate | Honduras | 3.00% | 7.00% | Panamá |
| Standard deviation | | 4.60% | 3.70% | |

* Jamaica is a Carribbean country
Source: Modified version of Amieva Huerta (2015, p.45).

In the region of Latin America and the Caribbean, the average VAT rate rose from 11.4% (time of its introduction) to 14.3%, which represents an increase of 25%. However, Latin America average rates are 25% lower than those of the OECD countries. Furthermore, the standard deviation decreased from 4.6 to 3.7, due to fundraising reasons and to a lesser extent to tax harmonisation. Note also, that the standard deviation for the case of the countries of the region of 3.7 is considerably lower than that of the OECD countries of 5.7.

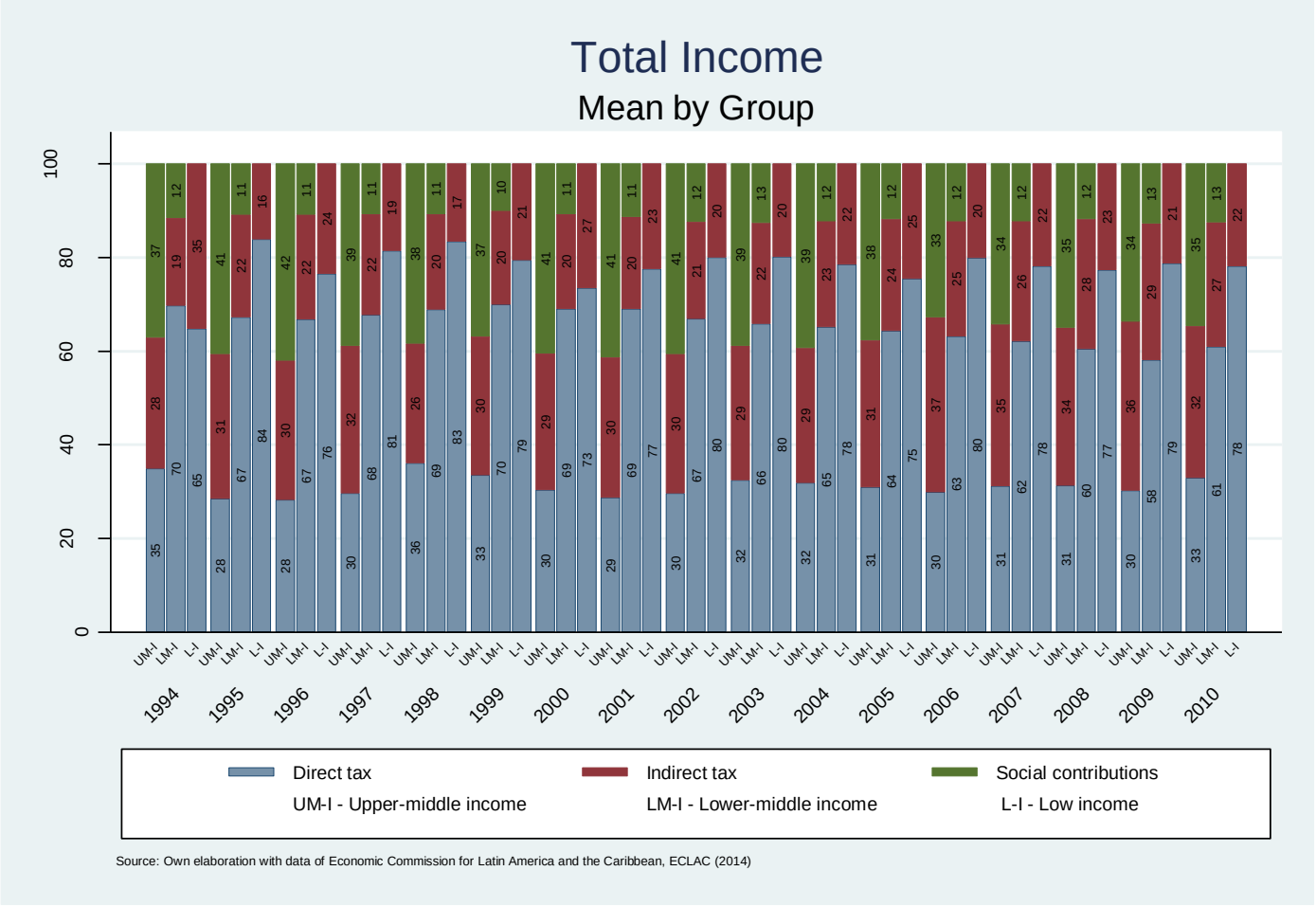
In June 2013, 12 countries in the region had a general rate of VAT greater than or equal to the Mexico. All of them with a greater tax burden than Mexico, like Argentina, Brazil, Chile, Colombia and Peru. According to the statistics of ECLAC (2012) tax burdens of these countries for 2011 were 7.9% for Argentina, 7.5% for Brazil, 7.6% for Chile, 5.3% for Colombia and 6.6% for Peru. The tax burden of the Latin America VAT, averaged 5.9%, compared to 3.9% in Mexico.

## *Revenue composition of subnational governments*

Decentralisation process in Latin America in federalist countries like Argentina, Brazil and Mexico has focused in transferring certain governmental functions to the local governments; in unitary countries with several levels of government, functions where as well transferred to local governments; however, the process has been quite heterogeneous and diverse, result of very different and dynamic institutional, social, political, economic and democratic framework. Likewise, there are some common characteristics: great vertical asymmetry between revenue and expenditure due to the misalignment of management and responsibilities. During the 80's the decentralization process began as a way to delegate power to lower levels of government and promote public sector efficiency, while during the 90's focus was given to earmarked transfers in health and education categories. The focus was mainly on expenditure. The revenue local governments have raised to provide services to the general public has been funded by own source revenue, transfers from the central government or debt. According to ECLAC (2014, p.23) total transfers increased 2.4% of GDP from 1997 to 2012, while local taxes increased only one percentage point during the same period. During 2012, transfers to local governments in Mexico accounted for 7.9% of GDP and almost 85% of local government's total revenue. Tax authorities at a local level have been particularly weak, with limited resources and capabilities. However, in the case of Brazil, local governments raise around 29% of total tax revenues, while Argentina and Colombia raise about 15% of total revenues. Property taxes, specific service and municipal taxes are mainly

collected by local governments, nonetheless general consumption taxes have been implemented in Brazil at a subnational level.

**Graph 4.1. Total income Central Government Latin America 1994-2010**



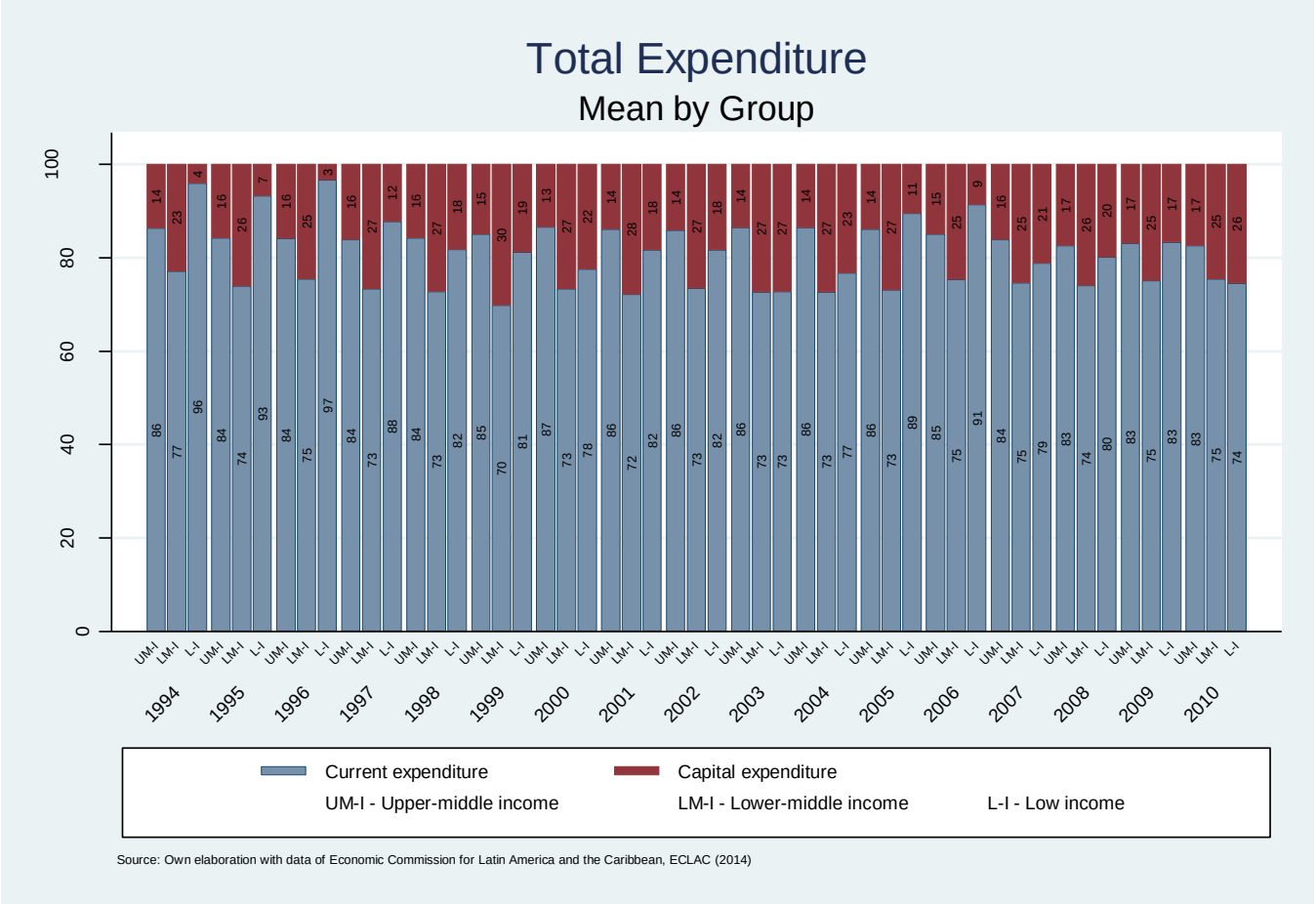

Source: Own elaboration with data of Economic Commission for Latin America and the Caribbean, ECLAC (2014)

## Table 4.4 Total income Central Government Latin America 1994-2010

| Group | Variable | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper middle income | Indirect Tax Income | 34.89 | 28.42 | 28.26 | 29.68 | 36.12 | 33.54 | 30.37 | 28.73 | 29.65 | 32.46 | 31.86 | 30.90 | 29.86 | 31.13 | 31.35 | 30.29 | 32.88 |
| | Direct Tax Income | 27.96 | 30.98 | 29.75 | 31.53 | 25.52 | 29.63 | 29.14 | 30.01 | 29.81 | 28.70 | 28.86 | 31.41 | 37.34 | 34.63 | 33.71 | 36.07 | 32.49 |
| | Social Contributions Income | 37.15 | 40.59 | 41.99 | 38.79 | 38.36 | 36.83 | 40.49 | 41.26 | 40.54 | 38.84 | 39.28 | 37.69 | 32.80 | 34.24 | 34.94 | 33.64 | 34.63 |
| Lower middle income | Indirect Tax Income | 70.67 | 68.35 | 66.81 | 67.87 | 69.41 | 69.86 | 69.09 | 69.04 | 67.20 | 66.09 | 65.27 | 64.49 | 63.47 | 62.72 | 61.17 | 57.99 | 60.98 |
| | Direct Tax Income | 18.09 | 21.02 | 21.79 | 21.01 | 20.06 | 20.03 | 20.32 | 19.71 | 20.55 | 21.11 | 22.61 | 23.94 | 24.51 | 25.32 | 27.34 | 29.72 | 26.84 |
| | Social Contributions Income | 11.24 | 10.63 | 11.40 | 11.12 | 10.53 | 10.11 | 10.59 | 11.25 | 12.24 | 12.80 | 12.12 | 11.58 | 12.03 | 11.96 | 11.49 | 12.29 | 12.19 |
| Low income | Indirect Tax Income | 64.79 | 83.83 | 76.50 | 81.37 | 83.44 | 79.45 | 73.47 | 77.47 | 79.94 | 80.08 | 78.43 | 75.47 | 79.81 | 78.10 | 77.30 | 78.67 | 78.15 |
| | Direct Tax Income | 35.21 | 16.17 | 23.50 | 18.63 | 16.56 | 20.55 | 26.53 | 22.53 | 20.06 | 19.92 | 21.57 | 24.53 | 20.19 | 21.90 | 22.70 | 21.33 | 21.85 |
| | Social Contributions Income | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] |

1) N.A. Value not available

**Graph 4.2 Total expenditure Central Government Latin America 1994-2010**

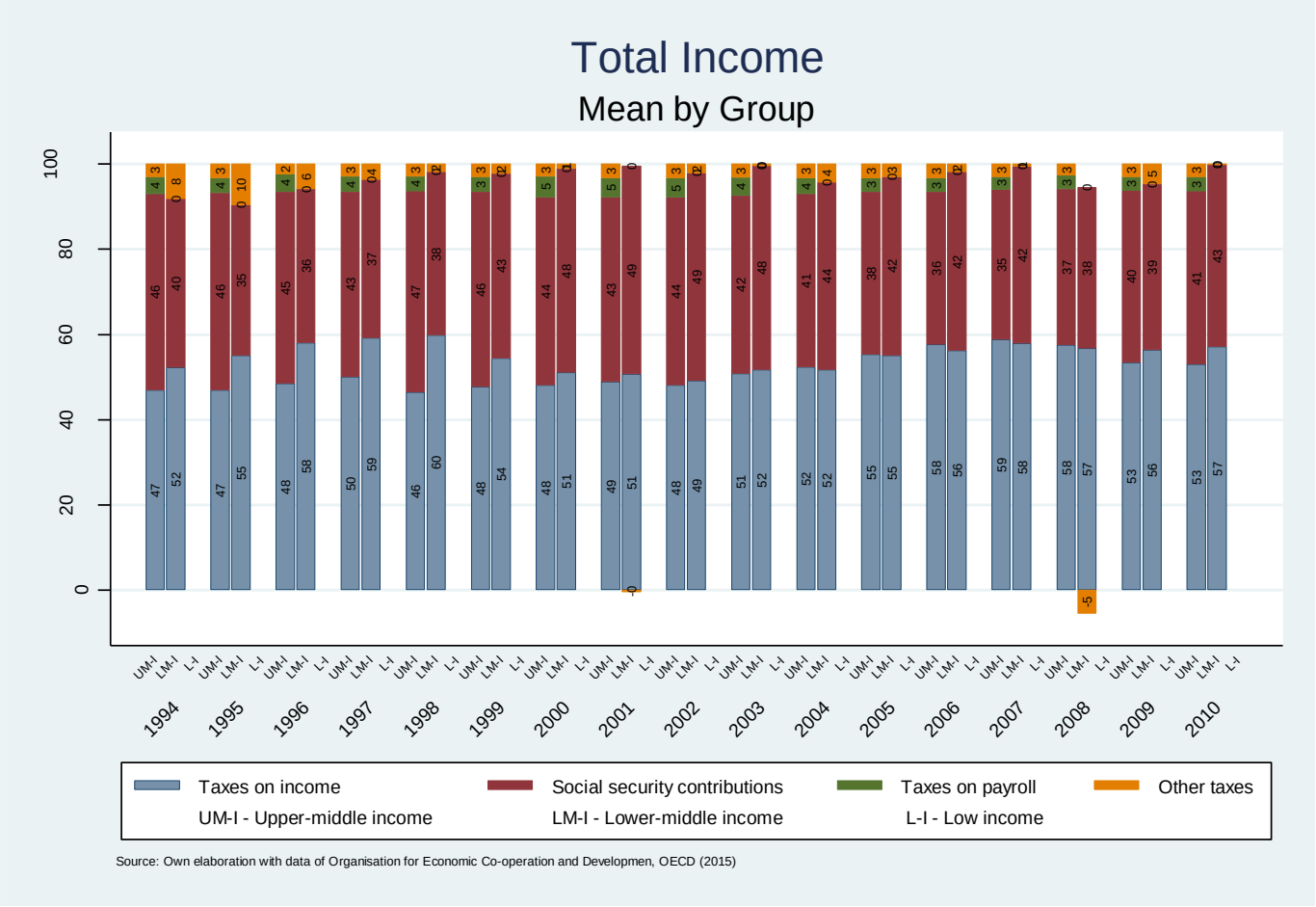



Source: Own elaboration with data of Economic Commission for Latin America and the Caribbean, ECLAC (2014)

## Table 4.5 Total expenditure Central Government Latin America 1994-2010

| Group | Variable | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper middle income | Current Expenditure | 86.25 | 84.16 | 84.13 | 83.88 | 84.23 | 85.00 | 86.60 | 86.05 | 85.83 | 86.42 | 86.45 | 86.05 | 85.02 | 83.88 | 82.52 | 83.08 | 82.51 |
| | Gov Cap Expenditure | 13.75 | 15.84 | 15.87 | 16.12 | 15.77 | 15.00 | 13.40 | 13.95 | 14.17 | 13.58 | 13.55 | 13.95 | 14.98 | 16.12 | 17.48 | 16.92 | 17.49 |
| Lower middle income | Current Expenditure | 77.01 | 73.95 | 75.43 | 73.28 | 72.69 | 69.76 | 73.35 | 72.09 | 73.48 | 72.61 | 72.66 | 73.13 | 75.24 | 74.56 | 74.00 | 75.04 | 75.45 |
| | Gov Cap Expenditure | 22.99 | 26.05 | 24.57 | 26.72 | 27.31 | 30.24 | 26.65 | 27.91 | 26.52 | 27.39 | 27.34 | 26.87 | 24.76 | 25.44 | 26.00 | 24.96 | 24.55 |
| Low income | Current Expenditure | 95.92 | 93.27 | 96.60 | 87.77 | 81.75 | 81.18 | 77.51 | 81.63 | 81.61 | 72.71 | 76.68 | 89.47 | 91.34 | 78.78 | 80.08 | 83.27 | 74.43 |
| | Gov Cap Expenditure | 4.08 | 6.73 | 3.40 | 12.23 | 18.25 | 18.82 | 22.49 | 18.37 | 18.39 | 27.29 | 23.32 | 10.53 | 8.66 | 21.22 | 19.92 | 16.73 | 25.57 |

**Graph 4.3 Total income General Government Latin America 1994-2010**



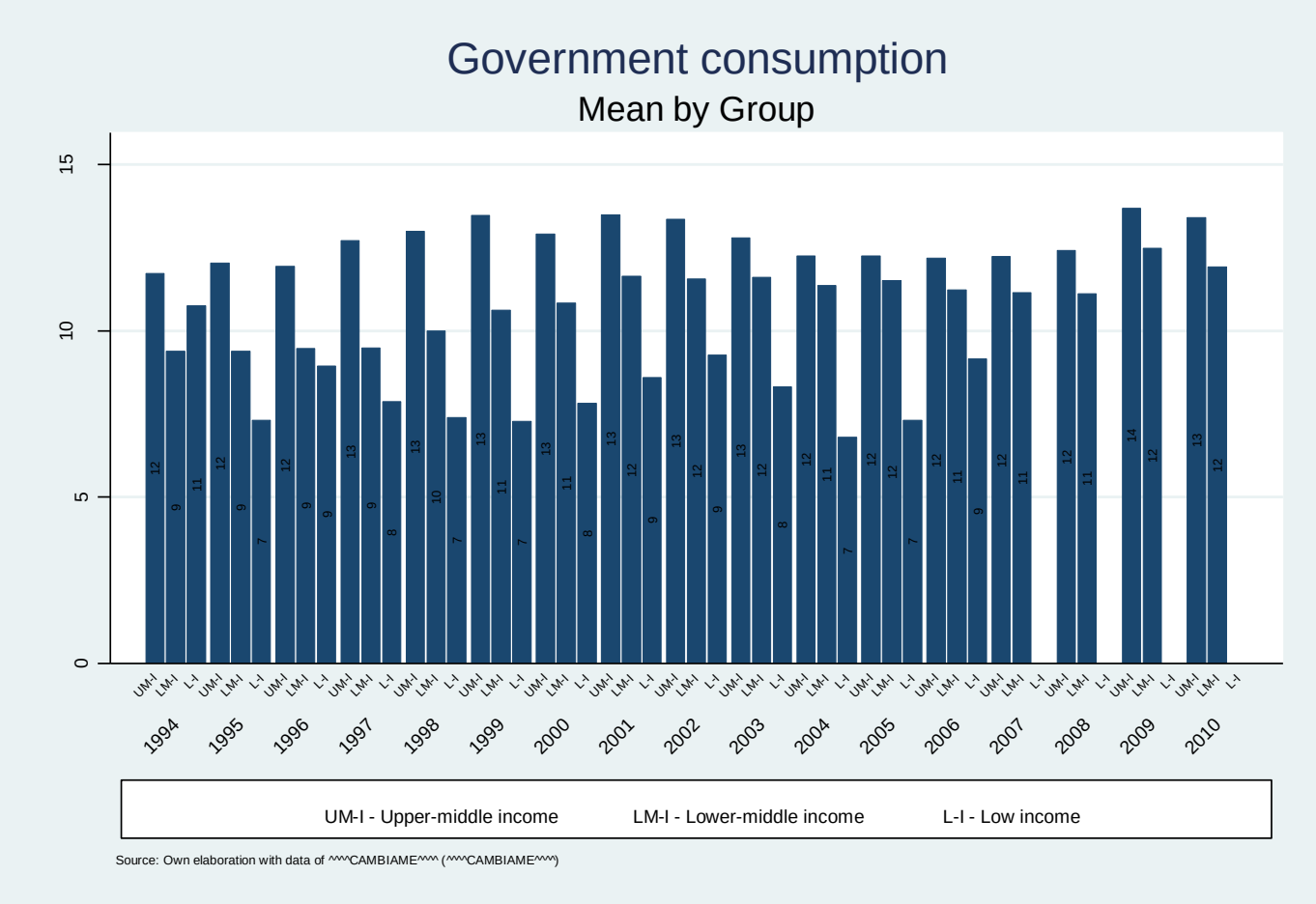

Source: Own elaboration with data of Organisation for Economic Co-operation and Developmen, OECD (2015)

## Table 4.6 Total income General Government Latin America 1994-2010

| Group | Variable | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper middle income | Taxes on income, profits and capital gains | 46.93 | 46.98 | 48.45 | 50.05 | 46.40 | 47.71 | 48.04 | 48.88 | 48.10 | 50.76 | 52.33 | 55.38 | 57.70 | 58.76 | 57.57 | 53.45 | 52.99 |
| | Social security contributions | 46.06 | 46.25 | 45.03 | 43.42 | 47.18 | 45.69 | 44.14 | 43.30 | 44.04 | 41.72 | 40.60 | 38.11 | 35.71 | 35.18 | 36.55 | 40.26 | 40.56 |
| | Taxes on payroll and workforce | 3.93 | 3.51 | 4.08 | 3.57 | 3.51 | 3.47 | 4.87 | 4.51 | 4.53 | 4.30 | 3.71 | 3.22 | 3.28 | 3.02 | 3.14 | 3.26 | 3.36 |
| | Other taxes | 3.08 | 3.27 | 2.44 | 2.97 | 2.92 | 3.13 | 2.95 | 3.31 | 3.33 | 3.22 | 3.36 | 3.28 | 3.31 | 3.04 | 2.73 | 3.03 | 3.09 |
| Lower middle income | Taxes on income, profits and capital gains | 52.21 | 55.11 | 57.98 | 59.17 | 59.80 | 54.45 | 51.04 | 51.14 | 49.17 | 51.70 | 51.76 | 55.10 | 56.21 | 57.87 | 63.64 | 56.39 | 57.13 |
| | Social security contributions | 39.57 | 35.26 | 36.15 | 37.10 | 38.24 | 43.21 | 47.77 | 49.35 | 48.60 | 47.86 | 43.92 | 41.85 | 41.85 | 41.51 | 42.50 | 38.90 | 42.58 |
| | Taxes on payroll and workforce | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] |
| | Other taxes | 8.21 | 9.63 | 5.87 | 3.73 | 1.96 | 2.35 | 1.19 | -0.49 | 2.23 | 0.44 | 4.32 | 3.06 | 1.94 | 0.62 | -6.14 | 4.71 | 0.30 |

1) N.A. Value not available

**Graph 4.4 Total expenditure General Government Latin America 1994-2010**



## Table 4.7 Total expenditure General Government Latin America 1994-2010

| Group | Variable | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper middle income | Government consumption | 11.72 | 12.03 | 11.93 | 12.72 | 13.00 | 13.47 | 12.92 | 13.49 | 13.36 | 12.79 | 12.25 | 12.25 | 12.19 | 12.23 | 12.42 | 13.69 | 13.41 |
| Lower middle income | Government consumption | 9.38 | 9.39 | 9.47 | 9.49 | 9.99 | 10.61 | 10.84 | 11.64 | 11.56 | 11.62 | 11.36 | 11.51 | 11.24 | 11.15 | 11.12 | 12.49 | 11.93 |
| Low income | Government consumption | 10.76 | 7.31 | 8.94 | 7.87 | 7.40 | 7.27 | 7.82 | 8.60 | 9.27 | 8.31 | 6.79 | 7.30 | 9.15 | N.A.[1] | N.A.[1] | N.A.[1] | N.A.[1] |

1) N.A. Value not available

**Graph. 4.5 Employment and Unemployment Latin America1994-2010**

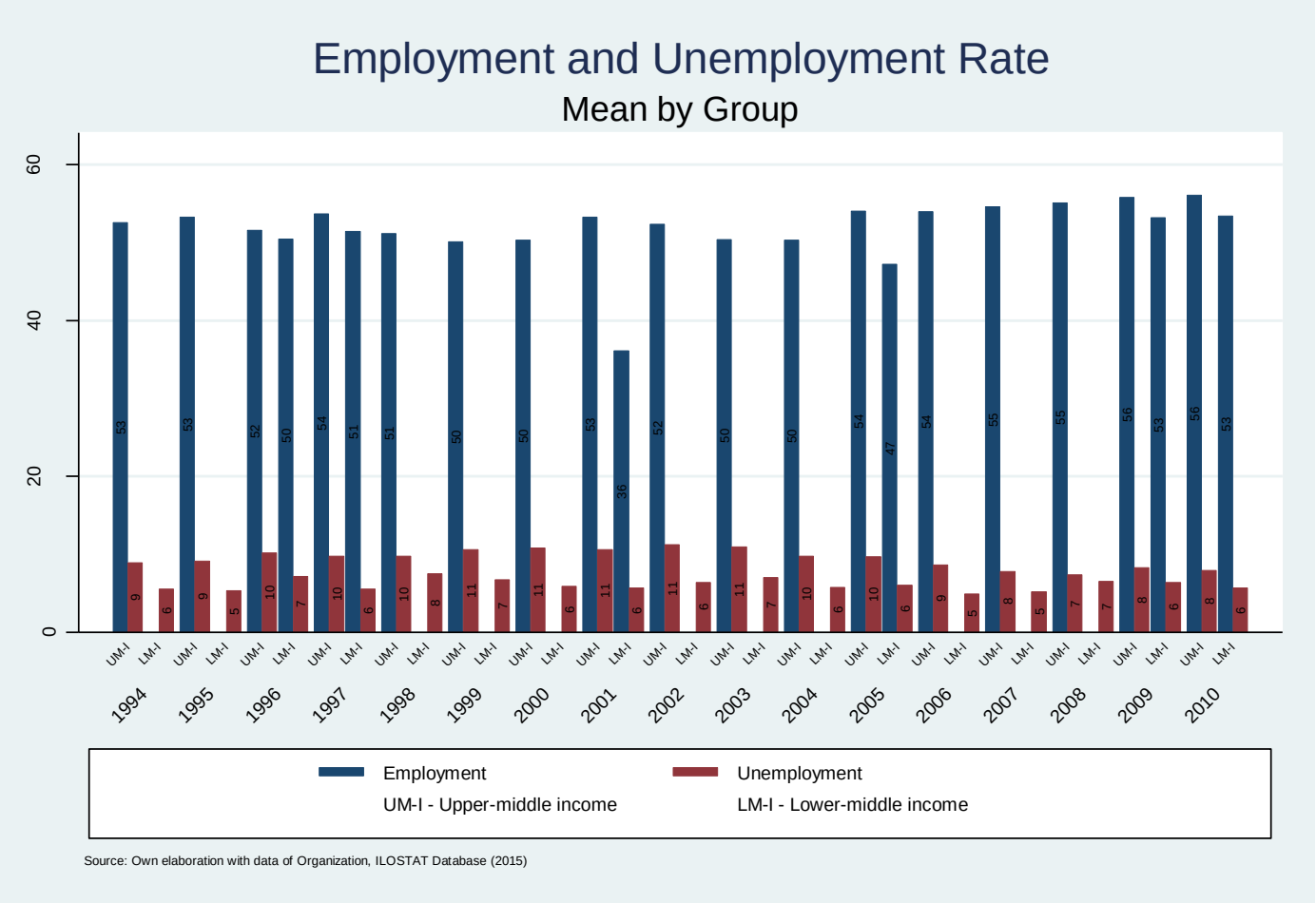


**Table 4.6 Employment and Unemployment Latin America1994-2010**

| Group | Variable | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper middle income | Employment rate | 52.54 | 53.26 | 51.60 | 53.65 | 51.18 | 50.12 | 50.32 | 53.29 | 52.33 | 50.41 | 50.30 | 54.05 | 53.98 | 54.57 | 55.12 | 55.83 | 56.10 |
| | Unemployment rate | 8.91 | 9.12 | 10.19 | 9.74 | 9.72 | 10.57 | 10.78 | 10.62 | 11.23 | 10.95 | 9.76 | 9.68 | 8.62 | 7.77 | 7.34 | 8.25 | 7.92 |
| Lower middle income | Employment rate | N.A.[1] | N.A.[1] | 50.47 | 51.41 | N.A.[1] | N.A.[1] | N.A.[1] | 36.10 | N.A.[1] | N.A.[1] | N.A.[1] | 47.25 | N.A.[1] | N.A.[1] | N.A.[1] | 53.16 | 53.42 |
| | Unemployment rate | 5.57 | 5.33 | 7.15 | 5.56 | 7.51 | 6.74 | 5.88 | 5.66 | 6.37 | 7.02 | 5.73 | 6.02 | 4.93 | 5.18 | 6.52 | 6.41 | 5.64 |

1) N.A. Value not available

## *Quality and Transparency of Public Expenditure*

Social expenditure in Latin America increased from 50% during 1992-1993 to 66% in 2010-2011, which means that social expenditure increased from 12.5% to 19.2 % of GDP during this period (ECLAC, 2014, p.61). In this respect health expenditure raised from 2.65% during the 90's to 3.9% of GDP in 2010-2011. However, not necessarily a higher expenditure reflects higher health quality for the population. In 2011, Latin American health expenditure was about 872 dollars per capita, while North American, OECD and European countries spent around 8,200, 4,400 and 2.300 dollars per capita, respectively. Moreover, regarding education expenditure in Latin America, it also increased to levels of 5% of GDP in 2009-2010, but also there is great heterogeneity and strong differences of GDP per capita expenditure between countries. Education expenditure per capita in the region increased from 121 dollars in the 90's to 279 dollars in 2009-2010. IN 2010, primary education expenditure per capita was of 14.7 % in Latin America in contrast to 22.9%, 22.3% and 22.4% in North America, OECD and European countries.

According to Schwellnus (2009) if health expenditure was spent more efficiently, life expectancy could increase by 4 years in Mexico, 3 years in Argentina and 2 years in Chile, Brazil and Uruguay. Mexico and Argentina could increase their PISA evaluation results in 74 and 90 points respectively if education resources where spent efficiently; in Chile, Brazil and Uruguay PISA results could increase 44, 32 and 35 points, respectively.

Afonso et al. (2013) determine efficiency indicators for the public sector in 23 Latin American economies from 2001 to 2010. Guatemala, Chile and Peru are the most efficient countries; followed by Dominican Republic, Ecuador and El Salvador. Best results in education are for Ecuador, Uruguay and Dominican Republic, while Dominican Republic, Ecuador and Guatemala have the better results in health expenditure. According to their study, Latin American countries could use 40% less resources to obtain the same result, or increase their productivity in 19% if they employed their resources efficiently.

There are five channels through with public finance can impact long-term growth: government size; fiscal position and sustainability; composition and efficiency of public expenditure; efficient tax structure and administration and adequate fiscal policy management. Recent developments have focused on management by results considering prioritising public policy and government planning, strategic objectives, adequate human resources, transparency and accountability in public transactions, controls, comprehensive spending reviews, audits, impact assessments and integrated financial management systems (Armijo and Espada, 2014).

## *4.2 Latin America: research topics in public finance*

The government is a provider of public goods (i.e. clean air and national defence) that contributes to diminish externalities (i.e. impose a green tax in order to avoid pollution), and it aims to redistribute income and wealth and promotes growth

through the negotiation of interest groups' demands (Cowen, T., 2002). According to Buchanan and Tullok (1962, p.21-30), the government is supposed to carry out the peoples' will and policies should reflect the best interest of voters. However, Niskanen (1971, p.227-230) argued that population preferences are only slightly reflected in political institutions as political leaders can often pursue their own interests and extract tax income from citizens. The distributive role of the state can be summarized as an insurance against risk to income for living in interdependent economies, or countries dependent on international trade, can function through involuntary redistribution from high income to low income groups as well as involuntary redistribution from some groups with fragile political power to those with higher power. Lybeck (1986, p.58-106) developed an integrated supply and demand model for twelve OECD developed economies where the interest group variable and the degree of unionization were significant for government growth. Persson and Tabellini (2000, p.1121-1127) emphasise that not only can democracy affect the size of the government but that the structure of the institutions is also relevant. They found that a presidential system leads to competition among different actors and that each closely monitors the others' activities.

### 4.2.1 Revenue

Taxes generate two main effects on the decision to work. On the one hand, the income effect makes agents become poorer and they have to work more in order to keep the same level of consumption. On the other hand, agents could choose more leisure and less work since the opportunity cost of leisure drops. Therefore, the final effect depends upon the magnitude of the income and substitution effect; whether they rather have more leisure instead of work or keep their level of consumption. At a country level, several studies have found a negative effect on growth, however, when analysing sub national governments, the result is not straightforward. Some literature suggests that taxation has a negative impact on growth. For instance, Gemmell (2011 p.44) when comparing the long-term impact of fiscal variables on growth for 17 OECD countries from

1970 to 2004, finds that distortionary taxation presents a negative sign considering that each country can take a different lag length up to 2. Using a sample of 22 OECD countries from 1970-1995, Kneller et al.(1999 p.171) endorse that distortionary taxation reduces growth, while non-distortionary taxes does not affect it. Dahlby et al. (2012 p.587) analyse the impact of tax changes on growth in Canadian provinces from 1997 to 2006 and identified that there is a negative correlation with corporate taxation, however, personal income tax does not seem to affect growth. However, some authors find no evidence of such relationship. Carnavire-Bacarreza et al. (2013, p.28) study taxation and economic growth in Latin America at a country level between 1990 and 2010, reporting that personal income tax does not seem to have any effect on growth, however, corporate income tax displays a positive and significant effect on growth in this region. Moreover, Alm and Rogers (2011, p.483) use local data pertaining to 48 states in the USA from 1947 to 1997 to estimate the effects of taxes, among other factors, on economic growth and discovered that the effect of taxation policies depends upon the regressors, the estimation method and the time period. Their results have demonstrated that there is no convergence in state per capita income.

Taxation literature explains that consumption taxes (indirect) promote savings, but the empirical evidence of this assumption remains questionable. High taxes on social security affects employment, since it would be a disincentive to work for employees, which in turn would provide a low base to finance social security, however, if the income effect is higher than the substitution effect, employees would be poorer and thus, would work more, regardless of the higher taxes. With respect to Latin American studies, Fricke and Süssmuth (2014) find a positive long run revenue elasticity of income tax (personal and corporate), VAT (internal and external) and social security contributions for eleven Latin American countries from 1993 to 2009. Nevertheless, by using a sample of 19 economies between 1990 and 2009, Canavire-Bacarreza et al. (2013) report that personal income tax has a positive effect in Latin American growth, and small negative effects in the case of corporate income tax, while a mixed effect on VAT. In this work, I expect that direct taxes have a negative relationship with

growth and employment, while indirect taxes have a positive relationship with both of them since the later does not modify relative prices.

Nonetheless, in this study I am pooling countries which have different levels of development and the effects might be offsetting. However, when I further re-calculated my regression by splitting the sample in two groups, so I could differentiate among them (low and middle income) the regressions did not work.

Martin-Mayoral and Uribe's (2010) results show that the main factors to increase revenue in 18 Latin American economies during the period 1975-2007 are: the level of development, investment specialisation and trade, however, institutions, democracy and inequity play a fundamental role on government revenue. Becerra's (2013) study focus on several social factors which affect tax collection in 18 Latin American economies during 2010 such as: perception of evasion by peers, as well as government trust and approval, which are significant determinants of tax morale.

The design of tax structures can stimulate growth according to the composition of the tax mix. In this current work, the focus is to take into account simultaneously the most significant revenue components and their impact on growth and not to analyse the appropriateness of each component. Nonetheless, Johansson´s empirical estimates of tax structure modifications and their impact on growth show that a change of 1 percent from direct to indirect taxes could have a positive impact on growth between 0.25 and one percentage points. Most OECD countries receive their revenue from three main sources: income taxes, excises on goods and services and social security contributions. However, a pragmatic tax reform would need to take into consideration efficiency, equity and simplicity issues, while maximizing tax revenue (Johansson et al., 2008 p.1, 7, 33, 43).

In this respect, it is important to acknowledge that the effects of taxes on developed countries can differ from those in developing countries, since their

initial position and levels of taxation are quite different. In the current study, there is a distinction among states and municipalities in Mexico according to the level of development of each locality, however, making a division for Latin America was not possible due to the availability of data.

Angelopoulos et al. (2012 p.237-239) analyse tax composition and its relationship with growth in the UK from 1970 to 2005 using a theoretical dynamic general equilibrium model. Their results suggest that reducing direct taxes while increasing indirect taxes can promote growth. Their findings demonstrate the importance of tax composition in policy design. However, if the objective is to promote welfare, policy makers should reduce capital taxation while increasing labour or consumption taxes. According to these authors' estimations, welfare gains are about two percentage points.

### 4.2.2 Expenditure

Capital expenditure categorised as productive could be expected to generate a positive impact on growth, while current expenditure can normally be linked to a negative effect on it. However, Devarajan (1996 p.313) when analysing a sample of 46 developing countries for the period 1970-1990, finds a surprising result; current expenditures in developing countries boost economic activity more than capital expenditures. This current study confirms his result. One explanation for this controversial finding is that productive expenditure may become unproductive if there is too much of it (Ono, 2011). Additionally, Daude et al. (2010 p.36) when analysing fiscal policy in Latin America report that discretionary fiscal policy has been pro-cyclical in Argentina, Brazil and Mexico but neutral in Chile. Nonetheless, although there are contrasts between Latin America and developed countries, in recent years, fiscal policy carried out in Latin American economies has played a stabilising role (Klemm, 2014, p.1).

The results of the current study in Latin America reveal that capital spending has a negative effect on growth at a central level, while government consumption has

also a negative coefficient at a general government level. These results are consistent with Devarajan et al.'s (1996) work that find that the relationship between government capital expenditure and growth is negative in 46 developing countries from 1970 to 1990 due to misallocations of public spending. Clements et al. (2007) in 17 economies from 1989 to 2006 and Lora (2009) in 50 countries between 1985 and 2003, indicate that although primary expenditures in Latin America have increased for a decade, particularly, their social expenditures, there is still substantial opportunity to increase government efficiency. Fernández-Arias and Montiel (2011) results suggest that productive public spending has been utilised during fiscal expansions in seven Latin American nations during the period 2007-2009.

Various empirical studies confirm the Keynesian positive reaction of private consumption to government spending (Tagkalakis, 2008). However, questions can be raised concerning how governments should spend taxpayers' money and how that spending should follow different paths under diverse economic conditions. Fiscal planners should then promote public goods which are complementary with private goods (roads and automobiles) in order to boost economic activity (Graves, 2010 p.9).

Afonso and Furceri (2010 p.517-521) develop a model which explains GDP per capita in terms of a set of revenue and expenditure components and their respective size and volatility. The countries included in their sample were 15 European Union members and 13 additional OECD countries, and covered seven five-year periods from 1970 to 2004. They use a set of control variables (initial level of GDP per capita, output volatility, investment share, human capital, average growth rate of population and openness) as well as the squared term for income and expenditure components in order to determine the existence of an "optimal government size". Their results show that both variables (income and expenditures) are significant for growth. In particular, they emphasised that indirect taxes (size and volatility), social contributions (size and volatility), government consumption (size and volatility), subsidies (size) and government

investment (volatility) have a considerable and detrimental effect on growth.

Helmi Hamdi et al. (2013 p.737) examine inter-temporal relationship between government revenues-expenditures-GDP with a sample of six countries from 1990 to 2010 utilising Granger causality. They elicited that government expenditures cause government revenues for Qatar and United Arab Emirates, while government revenues cause government expenditures for Saudi Arabia. Government expenditure links to GDP in Bahrain. GDP causes government revenue in Kuwait, Qatar and Saudi Arabia and GDP causes government expenditure in Oman and Qatar. Furthermore, in their study of five European countries using the same procedure for annual time series data from 1995 to 2009, Helmi Hamdi et al. (2013 p.1350) reported that government expenditure causes government revenue in Greece and Portugal. Government revenue links to GDP in Italy. Government revenue causes government expenditure in Ireland. Spain shows a bidirectional causality between revenue and expenditure to GDP and government revenue causes government expenditure.

### 4.2.3 Fiscal Federalism

Fiscal federalism refers to the way that different levels of government organise collection of taxes and provision of public services and thus coordinated responsibility is crucial to maximise the outputs of income and expenditure assignment (Hyman, 2008 p.690-691). This is relevant for the current study because approximately two thirds of revenues in Latin America derive from central government transfers. Hence, understanding the approach taken at different levels of government towards organising, distributing and applying resources is necessary in order to understand public finances at a local level. In this respect, according to Shah (2006 p.16) stabilization programmes should be conducted by the central government because the mobility of resources makes it difficult to develop an effective policy at the local level. Furthermore, local governments' reduced capability to borrow or their inability to issue money makes it difficult for them to pursue stabilization. In light of this, central governments focus on macroeconomic stability including monetary, fiscal and

redistribution policies, while the provision of public services is undertaken by local authorities. Although the central government plays a fundamental role in redistribution of income, local governments must guarantee the effective implementation of such policies (Oates, 1999 p.1121-1122). Additionally, Bird (2002 p.899) averred that the efficient provision of local services is possible when there is a clear mandate, suitable resources and accountability. Thus, the need for transparency in expenditure makes accountability for any resources canalised to local public authorities' essential. Local authorities need to raise taxes in the most efficient and strategic way based on their potential sources of income (charges for public services and local taxes). In the next chapter, this current study links the opinion people have regarding the satisfaction of municipal services in the 32 entities in Mexico with the fiscal policy mix of each state.

### 4.2.4 Labour

Barro and Redlick (2011 p.77, 99) found that when the unemployment rate is above 12 percent the multiplier is closer to one. Christiano determines that when the zero bound is reached, the multiplier can be up to ten (Canova, 2011a). Measurement and results concerning fiscal multipliers are very diverse, however, taking into account the results of Auerbach and Gorodnichenko (2010) regarding the size of fiscal multipliers, fiscal policy seems to be considerably more effective in recessions than in expansions.

Keynes' opponents stated that the price of goods is not only related to the amount produced, but also to the amount offered or supplied in the market (Robinson, 1933, p. 519-521). Additionally, Pigou contended that the level of private investment has no impact on employment and argued that cutting wages promotes greater employment. Explanations of unemployment based on a single cause can be misleading, and Pigou mentioned "expansionary policies" as a short run remedy (Leeson, 1997).

In a non-Keynesian world, where agents look at their permanent income rather than their disposable income at a specific time, an expansionary fiscal policy means that eventually debt or future taxes will rise and government spending will fall. Subsequently, private consumption can drop and offset the benefits of the fiscal expansion. In this case, more debt increases the financial risk to the country, elevates interest rates, decreases private investment, increases family savings and eventually shrinks aggregate demand and economic activity (Mendoza et al., 2007, p. 99-126).

As a matter of simplification, in a perfect labour market, the value of a job is equal to the reservation wage. The total surplus of a job is zero. The total surplus of a job is the worker's surplus plus the firm's surplus. The value of a job refers to the value of the production derived from the labour of the worker, in other words, the revenue derived from a job. The surplus of the worker is the difference between the wage received by the worker and his reservation wage, which is the minimum wage that the worker is willing to accept in order to work. The surplus of the firm is the difference between the value of a job and the wage paid to the worker. However, in an imperfect labour market, the total surplus is positive. Furthermore, labour market institutions refer to legislation, norms, regulations and outcomes from a collective choice mechanism to fix the pay rate, that is, it is the result of a political process. Labour market institutions exist as a result of a democracy in order to improve efficiency since there are market imperfections – information asymmetries and externalities. These institutions promote redistribution through labour taxes and transfers and/or function to meet the needs of particular interest groups in the employment protection legislation framework (Boeri & Van Ours, 2013, p.6-8, 20-21).

Blanchard & Wolfers (2000, p.1-32) analysed the relationship between labour market institutions and labour markets in 15 OECD countries from 1965 to 1990 and revealed considerable heterogeneity among institutions across Europe, therefore the improvement of institutions can derive in lower levels of unemployment.

## *Informal Sector*

The informal sector refers to the non-observed economy, however, it is distinguished from the underground and/or black-market economy. The underground economy refers to those activities that are hidden from public authorities while the black market refers to illegal activities. Complex legislation, administration, taxation and corruption encourage an underground economy (Mueller, 2003, p.560). The size of the informal sector in developing countries accounts for about 40 per cent of GDP (ibid) but is neither underground nor illegal, but rather is perceived as a survival economy (i.e. street sales). Governments have been increasingly interested in incorporating this sector to the overall development of their economies. Informality arises also in the employment sector. Although the informal sector was perceived originally as the residual economy since the economy did not have capacity to absorb all economic activity, it has risen in developing economies due to bureaucracy as well as there being complex and unclear regulations. In Latin America, this sector accounts for 29 per cent of non-agricultural GDP. The impact of informality on growth is still inconclusive. Informal firms are perceived as unfair competitors of formal enterprises due to their tax evasion and non-compliance. Additionally, considering informal small-scale provision of goods and services, their production results ineffective (CUTS International, 2009, p.1-6). Across countries there is a strong negative correlation between revenue and informality, particularly in low and middle-income countries. Although for the case of Mexico I was unable to find a proxy to measure informal economy, in Latin America I find a significant and negative association of informal labour market and growth (Woodruff, 2013, p.2).

**Table 4.8 Summary of several empirical studies**

| Author | Sample | Topics Analysed | Method | Main Results |
|---|---|---|---|---|
| **INCOME** | | | | |
| **Carnavire-Bacarreza et al. (2013)** | 4 Latin American Countries | Taxation and Growth | VAR | ➢ Personal income tax does not have any effect on growth.<br>➢ Corporate income tax displays a positive and significant effect on growth. |
| **Ormaechea, M. Yoo (2012)** | 69 countries (1970-2009)<br>21 high income<br>23 middle-income<br>25 low-income | Tax Composition and Growth | Pooled Mean Group | ➢ A percentage point increase in the income tax while reducing consumption and property tax is associated with a decrease in the long-run growth rate of GDP per capita by 0.07 percentage points.<br>➢ Among income taxes, personal income taxes and social security contributions present a stronger negative association with growth, 0.17 and 0.14 percentage points respectively; a shift from income taxes to property taxes by one percentage point has a strong positive association with growth of 0.04-0.07 percentage points, while reducing income taxes and increasing consumption taxes is associated with faster growth. |

| Author | Sample | Topics Analysed | Method | Main Results |
|---|---|---|---|---|
| **Johansson et al (2009)** | 30 OECD (1970-2007) | Tax revenue and tax mix and their effect on GDP | Analytic Descriptive and Pooled OLS | ➢ Most OECD countries receive their revenue from three main sources: income taxes, excises on goods and services and social security contributions<br>➢ Corporate taxes have been found to be the most harmful for growth, followed by personal income taxes and consumption taxes<br>➢ A pragmatic tax reform would need to take into consideration efficiency, equity and simplicity issues, while maximizing tax revenue |
| **EXPENDITURE** | | | | |
| **Tagkalakis (2008)** | 19 OECD (1970-2002) | Fiscal Policy in Recessions and Expansions | PANEL | ➢ Fiscal policy has Keynesian effects on private consumption expenditure<br>➢ Spending shocks affect consumption changes in recessions more than in expansions |
| **Nijkamp And Poot (2004)** | 93 Growth studies (1983-1988) | GDP and GDP per capita growth | Descriptive & Analytic | ➢ Elaborates a classification of the studies according to their coverage, their methodology and the ranking of the journals in which they were published, trying to address general conclusions.<br>➢ The effect of fiscal policy on growth is not strong<br>➢ The positive effect of education and infrastructure on growth is confirmed |
| **Bose et al (2003)** | 30 Developing (1983-1988) | GDP Growth | PANEL | ➢ Strong positive effect of investment in education on growth<br>➢ Government capital expenditure and private investment are positively linked to economic development |

| Author | Sample | Topics Analysed | Method | Main Results |
|---|---|---|---|---|
| **FISCAL CONSOLIDATION** | | | | |
| **Afonso and Furceri (2010)** | 15 EU, 13 OECD 7 5-year periods from 1970 to 2004 | Government size, composition, volatility and growth | Pooled country & Time fixed effects | ➢ Income and expenditures are significant for growth<br><br>A detrimental effect on growth is given by<br><br>➢ Indirect taxes (size and volatility)<br>➢ Social contributions (size and volatility)<br>➢ Government consumption (size and volatility)<br>➢ Subsidies (size) and<br>➢ Government investment (volatility) |

## *4.3 Some growth methodologies*

### *4.3.1 Vector Autoregressive*

VAR models have been very popular since the 1980's as a practical option to the traditional macro econometric models which were based upon a number of theoretical considerations. In the ancestries of this type of approach, there was not much theoretical support since the identification of causality among different sets of variables seemed unclear. Therefore, VAR literature has increasingly developed in order to have a practical way of analysing economic phenomena considering some theoretical fundamentals. VAR models have been used to determine the reaction of specific variables to a structural shock; to estimate the impact of a real shock on the variability of the data available; to derive historical development of various shocks related to the variables analysed and to develop diverse scenarios according to feasible real shocks (Kilian, 2011 p.1).

Blanchard and Perotti (2002) develop a structural VAR approach in order to determine the effect of government spending and taxation shocks on economic development in the United States for the post war period (1947-1997 quarterly), considering institutional information, and hence constructing estimates of fiscal policy shocks (Blanchard and Perotti, 2002 p.1329-1336). In this respect, both government expenditure and taxation have an impact on GDP, therefore, they construct a basic VAR specification:

$$Y_t = A(L,q)Y_{t-1} + U_t \qquad (4.1)$$

where

$A(L,q)$ = Quarterly distributed lag polynomial that allows each coefficient of a lag to depend on the quarter q that considers the dependant variable

$Y_t$ = A three-dimensional vector including $T_t$ (taxes), $G_t$ (expenditure) and $X_t$ (GDP) in real, per capita terms.

$U_t$ = Vector of residuals $[t_t, g_t, x_t]$

Their results show that government spending shocks have a positive effect on output while tax shocks have an adverse effect on it. However, expenditure and tax shocks have a negative effect on investment. Their model has been widely used and cited in the current literature and has proved to be of significant value to the analysis of fiscal policy. Nonetheless, the major drawback in this kind of models is that they only consider the time trend of the dependant variable without additional information or cross section data. The current study will analyse the development of fiscal variables in 17 years, which is a very short period of time to develop a time series analysis.

### *4.3.2 Instrumental Variable*

Lee and Sung (2007 p.442-444) analyse the fiscal position of 94 countries from 1972 to 1998 with the following responsiveness fiscal policy equation:

$$\Delta \ln(Z_{\mathrm{it}}) = \alpha_0 + \alpha_1 \Delta \ln(GDP_{\mathrm{it}}) + \alpha_2 t + \sum_{j \neq 1} \gamma_j D_j + \sum_{s \neq 1} \partial_s T_s + \in_{it} \quad (4.2)$$

Where $Z_{it}$ is the fiscal position of country i at time t, $\alpha_1$ is the elasticity of the fiscal position to changes in Gross Domestic Product (GDP), a de-trended variable function of time t, $D_j$ is the country j dummy variable and $T_s$ is the year dummy variable for years. They utilise as an instrumental variable, the weighted average of GDP growth rates in neighbouring countries, weighted by the inverse of the geographic distance between the two countries, finding high correlation between GDP growth rate in neighbouring countries and the country's GDP growth rate.

Additionally, they estimate an effectiveness of fiscal policy equation by regressing the standard deviation of GDP growth, considering as independent variables the log of GDP, the log of GDP growth rates, the log of GDP per capita, government size as a percentage of GDP, trade openness, the ratio of military expenditure and of oil production, economic fluctuations in neighbouring countries and the responsiveness of fiscal policy to business cycles.

$$StDev(\Delta lGDP)_i = \beta_0 + \beta_1 lGDP_i + \beta_2 \Delta lGDP_i + \beta_3 lGDPPC_i$$
$$+ \beta_4 (Gov_i/GDP_i) + \beta_5 Open_i + \beta_6 Mil_i + \beta_7 Oil_i + \beta_8 SD_i + \beta_9 Rsp_i \in_i \quad (4.3)$$

In the current study, the growth regression does not have proper instruments for the fiscal variables, therefore it utilises their first lag. Therefore, in order to account for endogeneity, this study is limited to partial correlations and not causality.

### 4.3.3 Pooled Mean Group

In the case of heterogeneous panels with T time-series observations and N groups, there could be two useful approaches: a) to estimate N distinct regressions and calculate the coefficient means, which would be a "mean group estimation"; or b) to pool the data and consider that the slope coefficients and error variances are homogeneous along the sample. However, an intermediate procedure could consist of a "pooled mean group estimation", which enables different short-run coefficients and error variances among groups but restrains long-run coefficients to be the same (Pesaran *et al.*, 1999 p.621).

Johansson et al. (2008 p.43,58) estimate cross-country effects of the tax mix on long-run GDP per capita in 21 OECD countries from 1970-2005 applying Pooled Mean Group analysis as well to the following growth equation:

$$\Delta lny_{i,t} = -\emptyset_i \left( lny_{i,t-1} - \theta_1 lns^k_{i,t} - \theta_2 lnh_{i,t} + \theta_3 n_{i,t} + \sum \theta_j lnV^j_{i,t} - a_{it} \right) +$$
$$b_{1,i} \Delta lns^k_{i,t} + b_{2,i} \Delta lnh_{i,t} + b_{3,i} \Delta n_{i,t} + \sum b_{ji} \Delta lnV^j_{i,t} + \in_{it} \quad (4.4)$$

Where y is output per capita, $s^k_{i,t}$, investment rate into physical capital, h human capital and n population. Vector V refers to a set of policy variables. In their analysis, they are interested in the different structure of taxes, therefore, Johansson et al. distinguish between personal and corporate income taxes,

consumption and property taxes. In the present study, the focus is the composition of revenues without any distinction among personal and corporate. Moreover, this research will include expenditure variables in order to measure their effect on output simultaneously.

### 4.3.4 Panel Data

Sutherland et al. (2010 p.73) describe the results of fiscal policy reaction functions from OECD countries considering fixed effect OLS where the dependant variable is the cyclically adjusted government balances as a percentage of potential output and the explanatory variables are lagged governmental balances, public debt, real house and stock pricing growth, openness, population, public sector size, debt service, GDP volatility and inflation. However, in the present study the fact that a particular locality has a balanced budget or not, is not the issue "per se", but the way that each local government manipulates income and expenditure variables in order to achieve governmental objectives. In fact, two localities could have similar fiscal positions but a different manner of allocating resources, which would in turn lead to different outcomes.

Afonso and Furceri (2010 p.6-12) consider GDP per capita growth in terms of a set of revenue and expenditure components and their respective volatility and a set of control variables (initial level of GDPP, output volatility, investment share, human capital, average growth rate of population and openness) as well as a squared term for income and expenditure components in order to determine the existence of an "optimal government size".

The original equations they consider are:

$$g_{i,t} = \propto_1 + \beta_1 R_{it} + \gamma_1 R_{it}^2 + \delta_1 \sigma_{it}^R + \vartheta_1 X_{it} + \emptyset_1 T_t + \vartheta_1 S_i + \in_{it} \quad (4.5)$$

$$g_{i,t} = \propto_2 + \beta_2 E_{it} + \gamma_2 E_{it}^2 + \delta_2 \sigma_{it}^E + \vartheta_2 X_{it} + \emptyset_2 T_t + \vartheta_2 S_i + \in_{it} \quad (4.6)$$

Where i denote country and t periods (1970-1974, 1975-1979….1999-2004)

$g_{i,t}$ is the real GDP per capita growth rate

$\propto_1$ and $\propto_2$ are the individual effects estimated for each country

R is a set of governmental revenue variables as a percentage of GDP

E is a set of governmental expenditure variables as a percentage of GDP

$\sigma_{it}^{R}$ and $\sigma_{it}^{E}$ are the volatility variables for income and expenditure

X is a set of control variables: initial level of output per capita, output volatility, investment share, human capital, average population growth and openness

The square terms for R and E test the effect of different government sizes on economic growth.

In a preliminary approach, this work was developed using this model but taking income and expenditure effects simultaneously, however, the number of variables in the right-hand side were too much, therefore, the final model keeps only the fiscal variables of interest without the squared and the deviation terms. Nonetheless, it is important to acknowledge that the current analysis considers a simultaneous analysis of revenue and spending variables but also develops separate regressions for income and expenditure. Results are different in each case, which proves that it is not the same to take income or expenditure variables simultaneously or separately; therefore, it is important to consider the main income and expenditure components when analysing fiscal policy to have a full picture of the budgeting process.

According to Bassanini and Duval (2006 p.11-14) the most common factors which affect unemployment are several policy and institutional determinants such as: unemployment benefits, taxes, trade union bargaining power, employment legislation, market regulation framework, employment policies, minimum wage and housing policies. Their reduced unemployment equation estimated for 20 OECD countries over the period 1982-2003 is:

$$U_{\mathrm{it}} = \sum_{j} \beta_j \, X_{i,t}^{j} + \chi G_{\mathrm{it}} + \alpha_i + \lambda_t + \in_{it} \qquad (4.7)$$

Where $U_{\mathrm{it}}$ is the rate of unemployment, $G_{\mathrm{it}}$ is the output gap, $\alpha_i$ and $\lambda_t$ are country and time fixed effects, while $X_{i,t}^{j}$ are indicators for policies and institutions: tax burden, an average measure of unemployment benefits, rigidity of employment legislation, market regulation inflexibility across seven non-manufacturing industries, union membership rates and degree of centralisation of wage negotiation, a proxy for corporatism.

They use pooled cross country/time series with country and time fixed effects, where tax burden, average unemployment benefits and market regulation rigidity have a positive and significant relationship with unemployment, while the degree of corporatism and the output gap are negatively related with unemployment. Employment legislation and union concentration were not significant. Regarding policy interactions, Bassanini and Duval conclude that reform packages have a higher impact on reducing unemployment than isolated reforms. If reforms are "employment friendly" they will be complimentary to similar reforms in the same direction and reduce overall unemployment. They also find a high correlation between the rate of home ownership and unemployment, acknowledging the fact of endogeneity. No significant impact is found among minimum wage and unemployment. Average labour market policy expenditures per unemployed as a percentage of GDP per capita are linked to lower levels of unemployment. Moreover, different structural policy frameworks will generate distinctive employment outcomes.

Labour market performance is related to unemployment and employment as well, since people decide to work according to education, leisure, policies and institutional framework.

In this work, the approach is to use the same model utilised in my growth regression and simply change the dependent variable to employment in the case

of Mexican localities and to unemployment in the case of Latin American countries, although regression for employment and unemployment were estimated for both, data availability for employment is better in the case of Mexico and more observations are available for the case of unemployment in Latin America.

## *4.4 Fiscal Policy Mix Country Analysis*

### 4.4.1 Fiscal policy model, methodology and data

My empirical analysis considers 20 Latin American economies from 1994 to 2010, with the purpose of outlining different income and expenditure trends and their impact on economic development. The period of analysis is the same as in my Mexican states and municipalities study in order to be able to make it comparable. As I did in my previous two chapters, I analyse the main income and expenditure components simultaneously, when evaluating changes in GDP per capita growth. In order to test my hypothesis, I run regressions considering income or expenditure components separately and then together (detailed in the appendix) and my findings show that there is a difference between the coefficients in all three regressions with slightly more significant coefficients in my broader model.

I apply a fixed effects panel data model with and without allowing for cross sectional dependence in my dataset, and it also includes as a matter of comparison the system GMM. The corresponding Stata commands are "xtreg", "xtabond2" and "xtscc". The specification tests are included before the regressions. All my explanatory variables are lagged by one year and include year dummies.

## Fiscal Policy Model

The framework for my analysis is Gemmell's Budget Government Constraint Model detailed in chapter two, however, I utilise a fixed effects panel data model allowing for cross sectional dependence in my baseline specification.

## Regression equation

In this thesis in order to properly analyse fiscal variables, the estimation equation is as follows:

$$\Delta Y_{i,t} = \propto_i + \theta_1 Y_{i,t-1} + \beta_1 (R)_{i,t-1} + \beta_2 (E)_{i,t-1} + \theta_2 X_{it-1} + l_{i,t} + y_{i,t} + u_{i,t} \quad (4.8)$$

Where:

| | |
|---|---|
| i | = country |
| t | = time |
| $\propto_i$ | = Fixed effect for each country i |
| Y | = GDP per capita level |
| R | = Direct and indirect taxes or taxes on income, payroll and other income |
| E | = Acquisition of fixed assets and capital transfers or government consumption |
| X | = Control variables (Trade, foreign direct investment, informal employment, poverty, time to start a business, expenditure per student, health expenditure per capita, R&D expenditure, roads paved and internet) |
| lit | = Country fixed effects component |

yit = Year fixed effects component

The main hypothesis is:

$$\Delta X_{it} = \text{f}(\text{R}_{it-1}, E_{it-1}, \text{X}_{it-1}) \quad (4.9)$$

The main income and spending variables should be considered when analysing the development of GDP per capita.

Additionally, this study will analyse unemployment and its correlation with transfers and taxes levied as follows:

$$L^U{}_{i,t} = \propto_i + \theta_1 Y_{i,t-1} + \beta_1 (R)_{i,t-1} + \beta_2 (E)_{i,t-1} + \theta_2 X_{it-1} + l_{i,t} + y_{i,t} + u_{i,t} \quad (4.10)$$

Where

$L^U$ = Rate of formal unemployment in locality i at time t

## Data and choice of variables

The Latin American countries analysed according to their level of government were: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela. The fiscal policy variables included were direct and indirect taxes, social contributions, current and capital expenditures in the case of central government; taxes on income, social security contributions, taxes on payroll, other taxes and government consumption in the case of general government. The central government includes the institutional units which are controlled and financed by the central government. The general government includes central, state and local government. A detailed description of the variables used and the sources of my figures is described in Table 4.9 and Table 4.10.

The regression equation links growth with the fiscal variables afore mentioned as a share of total revenue or expenditure. The control variables employed reflect the country level of development.

# Table 4.9 List of Variables, Latin America Central Government

| Variable | Definition | Mean | Std. Dev. | CV | Source |
|---|---|---|---|---|---|
| **Dependent variables** | | | | | |
| **Growth** | Annual real gross domestic product per capita growth in percentage | 0.0675 | 0.1242 | 183.8572 | United Nations (2014); author's calculations. |
| **Employment rate** | Employment rate | 53.6400 | 5.2100 | 9.7129 | International Labour Organization, ILOSTAT Database (2015); author´s calculations. |
| **Unemployment rate** | Unemployment rate | 8.6400 | 4.1800 | 48.3796 | International Labour Organization, ILOSTAT Database (2015); author´s calculations. |
| **Fiscal policy variables** | | | | | |
| **Direct tax** | Direct taxes as a percentage of total goverment Income, multiplied by 100 | 0.0156 | 0.0642 | 412.2413 | Economic Commission for Latin America and the Caribbean, ECLAC (2014); author's calculations. |
| **Indirect tax** | Indirect taxes as a percentage of total government Income, multiplied by 100 | 0.0160 | 0.0653 | 407.2154 | Economic Commission for Latin America and the Caribbean, ECLAC (2014); author's calculations. |
| **Social contributions** | Social contributions as a percentage of total government Income, multiplied by 100 | 0.0203 | 0.0822 | 404.7652 | Economic Commission for Latin America and the Caribbean, ECLAC (2014); author's calculations. |
| **Current expenditure** | Current expenditure as a percentage of total government expenditure, multiplied by 100,000 | 0.8079 | 0.0876 | 10.8416 | Economic Commission for Latin America and the Caribbean, ECLAC (2014); author's calculations. |
| **Capital expenditure** | Capital investment as a percentage of total governement expenditure, multiplied by 100,000 | 0.1854 | 0.0863 | 46.5420 | Economic Commission for Latin America and the Caribbean, ECLAC (2014); author's calculations. |
| **Control variables** | | | | | |
| **Real gdp per capita** | Annual gross domestic product per capita level (2005=100), divided by 100,000 | 0.0360 | 0.0197 | 54.6522 | United Nations (2014); author's calculations. |
| **Minimum wage** | Average annual minimum wage (2005=100), divided by 100,000 | 0.0010 | 0.0002 | 24.3762 | Latin America Economic Observatory, OBELA (2015); author's calculations. |
| **Life expectancy** | Life expectancy at birth, in years, divided by 1,000 | 0.0719 | 0.0045 | 6.2397 | Economic Commission for Latin America and the Caribbean, ECLAC (2014); author's calculations. |
| **Population growth** | Annual percentage population growth rate, divided by 1,000 | 0.0015 | 0.0006 | 41.0270 | Economic Commission for Latin America and the Caribbean, ECLAC (2014); author's calculations. |
| **Primary education enrollment** | Primary education enrollment, in years | 0.1403 | 0.0272 | 19.3844 | Economic Commission for Latin America and the Caribbean, ECLAC (2014); author's calculations. |
| **Total investment** | Total investment, private and public, as a percentage of GDPP, multiplied by 1,000 | 0.0200 | 0.0067 | 33.5185 | IMF World Economic Outlook by Country, WEO (2013); author's calculations. |
| **Potable water** | Proportion of the population using improved drinking water sources, divided by 10,000 | 0.0867 | 0.0091 | 10.4916 | United Nations (2015); author's calculations. |
| **Electric power consumption** | Electric power consumption (kWh per capita), divided by 100,000 | 0.0120 | 0.0079 | 65.7421 | United Nations (2015); author's calculations. |
| **Trade** | Trade as a share of gross domestic product, divided by 10,000 | 0.0619 | 0.0338 | 54.6421 | World Bank (2015); author's calculations. |
| **Foreign direct investment** | Foreign direct investment, net inflows as a percentage of GDPP, multiplied by 1,000 | 0.0031 | 0.0024 | 79.0899 | World Bank (2015); author's calculations. |
| **Informal employment** | Informal urban employment as a percentage of urban employed population, divided by 10,000 | 0.0481 | 0.0086 | 17.9759 | United Nations (2015); author's calculations. |
| **High technology exports** | High technology exports as a percentage of manufactured exports, divided by 10,000 | 0.0008 | 0.0011 | 142.0201 | United Nations (2015); author's calculations. |
| **Poverty** | Poverty headcount ratio at $2 a day, percentage of population, divided by 10,000 | 0.0190 | 0.0115 | 60.3893 | World Bank, World Development Indicators (2015); author's calculations. |
| **Time to Start a Business** | Time required to start a business, in days | 0.0009 | 0.0006 | 74.1422 | World Bank, World Development Indicators (2015); author's calculations. |
| **Expenditure per student, primary** | Government expenditure per student in primary as a percentage of GDP per capita | 0.0107 | 0.0073 | 68.3881 | World Bank, World Development Indicators (2015); author's calculations. |
| **Health expenditure per capita** | Health expenditure per capita, PPP (constant 2005 international dollars) | 0.0431 | 0.0278 | 64.3884 | World Bank, World Development Indicators (2015); author's calculations. |
| **Trns R&D expenditure** | Research and development expenditure as percentage of GDP | 0.0232 | 0.0272 | 117.3559 | World Bank, World Development Indicators (2015); author's calculations. |
| **Road paved** | Roads paved as percentage of total roads | 0.0256 | 0.0128 | 50.0762 | World Bank, World Development Indicators (2015); author's calculations. |
| **Telephone** | Fixed-telephone subscriptions per 100 inhabitants | 0.0120 | 0.0079 | 65.4876 | World Bank, World Development Indicators (2015); author's calculations. |
| **Waste collection** | Total population served by municipal waste collection | 0.0055 | 0.0038 | 67.7700 | United Nations (2015); author's calculations. |
| **Area sown** | Agricultural land as percentage of total land area | 0.3535 | 0.6354 | 179.7228 | World Bank, World Development Indicators (2015); author's calculations. |
| **Internet** | Percentage of individuals using Internet | 0.0080 | 0.0103 | 129.0407 | World Bank, World Development Indicators (2015); author's calculations. |

# Table 4.10 List of Variables, Latin America General Government

| Variable | Definition | Mean | Std. Dev. | CV | Source |
|---|---|---|---|---|---|
| **Dependent variables** | | | | | |
| **Growth** | Annual real gross domestic product per capita growth in percentage | 0.0670 | 0.1223 | 182.5024 | United Nations (2014); author's calculations. |
| **Employment rate** | Employment rate | 53.6400 | 5.2100 | 9.7129 | International Labour Organization, ILOSTAT Database (2015); author´s calculations. |
| **Unemployment rate** | Unemployment rate | 8.6400 | 4.1800 | 48.3796 | International Labour Organization, ILOSTAT Database (2015); author´s calculations. |
| **Fiscal policy variables** | | | | | |
| **Taxes on income** | Direct taxes as a percentage of total goverment Income, multiplied by 100 | 3.6800 | 1.6425 | 44.6333 | Economic Commission for Latin America and the Caribbean, ECLAC (2014); author's calculations. |
| **Social security contributions** | Indirect taxes as a percentage of total government Income, multiplied by 100 | 2.9325 | 2.0240 | 69.0179 | Economic Commission for Latin America and the Caribbean, ECLAC (2014); author's calculations. |
| **Taxes on payroll** | Social contributions as a percentage of total government Income, multiplied by 100 | 0.2758 | 0.3316 | 120.2383 | Economic Commission for Latin America and the Caribbean, ECLAC (2014); author's calculations. |
| **Other taxes** | Current expenditure as a percentage of total government expenditure, multiplied by 100,000 | 0.2012 | 0.3558 | 176.8955 | Economic Commission for Latin America and the Caribbean, ECLAC (2014); author's calculations. |
| **Government consumption** | Capital investment as a percentage of total governement expenditure, multiplied by 100,000 | 11.7738 | 3.4666 | 29.4434 | Economic Commission for Latin America and the Caribbean, ECLAC (2014); author's calculations. |
| **Control variables** | | | | | |
| **Real gdp per capita** | Annual gross domestic product per capita level (2005=100), divided by 100,000 | 0.0347 | 0.0200 | 57.6465 | United Nations (2014); author's calculations. |
| **Minimum wage** | Average annual minimum wage (2005=100), divided by 100,000 | 0.0010 | 0.0002 | 23.9569 | Latin America Economic Observatory, OBELA (2015); author's calculations. |
| **Life expectancy** | Life expectancy at birth, in years, divided by 1,000 | 0.0714 | 0.0048 | 6.6831 | Economic Commission for Latin America and the Caribbean, ECLAC (2014); author's calculations. |
| **Population growth** | Annual percentage population growth rate, divided by 1,000 | 0.0015 | 0.0006 | 40.0788 | Economic Commission for Latin America and the Caribbean, ECLAC (2014); author's calculations. |
| **Primary education enrollment** | Primary education enrollment, in years | 0.1416 | 0.0271 | 19.1656 | Economic Commission for Latin America and the Caribbean, ECLAC (2014); author's calculations. |
| **Total investment** | Total investment, private and public, as a percentage of GDPP, multiplied by 1,000 | 0.0198 | 0.0066 | 33.3925 | IMF World Economic Outlook by Country, WEO (2013); author's calculations. |
| **Potable water** | Proportion of the population using improved drinking water sources, divided by 10,000 | 0.0864 | 0.0091 | 10.4836 | United Nations (2015); author's calculations. |
| **Electric power consumption** | Electric power consumption (kWh per capita), divided by 100,000 | 0.0116 | 0.0078 | 67.7848 | United Nations (2015); author's calculations. |
| **Trade** | Trade as a share of gross domestic product, divided by 10,000 | 0.0616 | 0.0331 | 53.6892 | World Bank (2015); author's calculations. |
| **Foreign direct investment** | Foreign direct investment, net inflows as a percentage of GDPP, multiplied by 1,000 | 0.0032 | 0.0026 | 80.9425 | World Bank (2015); author's calculations. |
| **Informal employment** | Informal urban employment as a percentage of urban employed population, divided by 10,000 | 0.0489 | 0.0091 | 18.6844 | United Nations (2015); author's calculations. |
| **High technology exports** | High technology exports as a percentage of manufactured exports, divided by 10,000 | 0.0009 | 0.0012 | 139.8221 | United Nations (2015); author's calculations. |
| **Poverty** | Poverty headcount ratio at $2 a day, percentage of population, divided by 10,000 | 0.0195 | 0.0114 | 58.3857 | World Bank, World Development Indicators (2014); author's calculations. |
| **Time to Start a Business** | Time required to start a business, in days | 0.0008 | 0.0006 | 73.8440 | World Bank, World Development Indicators (2015); author's calculations. |
| **Expenditure per student, primary** | Government expenditure per student in primary as a percentage of GDP per capita | 0.0109 | 0.0072 | 66.0231 | World Bank, World Development Indicators (2015); author's calculations. |
| **Health expenditure per capita** | Health expenditure per capita, PPP (constant 2005 international dollars) | 0.0418 | 0.0277 | 66.0930 | World Bank, World Development Indicators (2015); author's calculations. |
| **Trns R&D expenditure** | Research and development expenditure as percentage of GDP | 0.0234 | 0.0264 | 112.9873 | World Bank, World Development Indicators (2015); author's calculations. |
| **Road paved** | Roads paved as percentage of total roads | 0.0246 | 0.0132 | 53.5990 | World Bank, World Development Indicators (2015); author's calculations. |
| **Telephone** | Fixed-telephone subscriptions per 100 inhabitants | 0.0117 | 0.0078 | 66.6032 | World Bank, World Development Indicators (2015); author's calculations. |
| **Waste collection** | Total population served by municipal waste collection | 0.0054 | 0.0035 | 64.7724 | United Nations (2015); author's calculations. |
| **Area sown** | Agricultural land as percentage of total land area | 0.3542 | 0.6192 | 174.8061 | World Bank, World Development Indicators (2015); author's calculations. |
| **Internet** | Percentage of individuals using Internet | 0.0077 | 0.0101 | 130.2558 | World Bank, World Development Indicators (2015); author's calculations. |

### 4.2.2 Growth

In this section, the proposed panel data model will be applied to my sample with the aim of determining the fiscal policy mix in two levels of government during the period of study and its impact on economic development. This empirical estimation analyses the development of real GDP per capita growth as a function of taxes, expenditures and a set of control variables such as: lagged value of real GDP per capita, life expectancy, population growth and primary education enrollment.

My estimations for countries are done considering cross-sectional dependence estimator which allowed me to account for autocorrelation and cross sectional dependence (Table 4.14 for central government and Table 4.18 for general government). The variables added in my robustness checks are: trade, foreign direct investment, informal employment, poverty, time to start a business, expenditure per student, health expenditure per capita, R&D expenditure, roads paved and internet. The specification tests are included before the regressions.

Overall, the effect of taxes on growth was not significant at a central government level, however, in the case of general government the effect of taxes on income was negative and significant. In Acosta-Ormaechea and Jiae Yoo study (2012) overall tax burden has a clear negative effect on growth, however they consider that there is a positive association of VAT with growth. Although consumption taxes (indirect) have been seen as promoting savings, the empirical evidence is inconclusive (Johansson et al., 2008). Conversely, Fricke and Süssmuth (2014) find a positive long run revenue elasticity of income tax (personal and corporate) and VAT (internal and external) for 11 Latin American economies. Canavire-Bacarreza et al. (2013) find that personal income tax has a positive effect in Latin American growth, and small negative effects in the case of corporate income tax, while mixed effect on VAT. In my case, since I am pooling countries which have different levels of development, the effects might be offsetting, however,

when I recalculate my regression by splitting the sample in two groups (low and middle income), my regression do not work.

Martin-Mayoral and Uribe (2010) results show that the main factors to increase revenue in 18 Latin American economies are: the level of development, investment specialisation and trade, however, institutions, democracy and inequity play a fundamental role on government revenue. Besides, Becerra (2013) study focus on several social factors which affect tax collection in 18 Latin American economies such as: perception of evasion by peers, as well as government trust and approval, which are significant determinants of tax morale.

In relation to government expenditure, acquisition of fixed assets has negative and significant effect on growth while capital transfers have a positive and significant effect at a central level, while government consumption coefficient is not significant at a general government level. These results should be taken with caution since within the same country there are several problems when comparing similar concepts due to differences in reporting. Likewise, when comparing statistics of different countries with several sources of information and with dissimilar methodological procedures, data might be misleading. As mentioned throughout my dissertation, the lack of data has been a major drawback to further comparisons. In my three empirical chapters, available variables have been different in each database, therefore, only partial comparisons have been possible. Considering also the weak exogeneity within my variables, I can only provide partial correlations but not causality. Clements et al. (2007) and Lora (2009) find that primary expenditures in Latin America have increased in a decade, particularly, social expenditures, however, there is a substantial opportunity to increase government efficiency. Besides, Fernández-Arias and Montiel (2011) results suggest that productive public spending have been utilised during fiscal expansions in a sample of Latin American nations. Nonetheless, when I recalculate my regression by splitting the sample in two groups, so I can differentiate among the different economies (low and middle income) the regressions do not work because there are not enough data.

Turning to the control variables utilised, I find trade (Frankel and Romer, 1999) and foreign direct investment (Sala-i-Martin, 2004) have a positive impact on growth; while primary education enrollment (Barro and Lee, 1994) and informal employment have a negative coefficient; while roads paved coefficient (Barrios, 2009) impact growth positively.

## Table 4.11 Fisher Unit Root Test

| Unit Root Test | I chi-squared | p-value |
|---|---|---|
| Growth | 169.00 | 0.00 |
| Direct tax (Corporate) | 50.38 | 0.03 |
| Indirect tax | 119.14 | 0.00 |
| Wages and salaries | 119.89 | 0.00 |
| Aquisition of fixed assets | 90.80 | 0.00 |
| Capital transfers | 83.71 | 0.00 |
| Trade | 111.24 | 0.00 |
| Foreign direct investment | 140.45 | 0.00 |
| Informal employment | 96.33 | 0.00 |
| Poverty | 100.82 | 0.00 |
| Time to start a business | 73.59 | 0.00 |
| Expenditure per student | 115.13 | 0.00 |
| Health expenditure per capita | 68.46 | 0.00 |
| R&D expenditure | 75.57 | 0.00 |
| Roads paved | 96.42 | 0.00 |
| Internet | 36.47 | 0.45 |

## Table 4.12 Heteroskesdasticity Test

| Test | Value | p-value |
|---|---|---|
| Mod. Wald test | 86.25 | 0.00 |

## Table 4.13 Collinearity Test

| | Collinearity statistics | |
|---|---|---|
| VARIABLES | Tolerance | VIF |
| Direct tax (Corporate) | 0.87 | 1.15 |
| Indirect tax | 0.59 | 1.69 |
| Wages and salaries | 0.38 | 2.60 |
| Aquisition of fixed assets | 0.67 | 1.50 |
| Capital transfers | 0.75 | 1.34 |
| Real gdp per capita | 0.20 | 4.98 |
| Life expectancy | 0.27 | 3.70 |
| Population growth | 0.50 | 1.99 |
| Primary education enrollment | 0.35 | 2.85 |

# Table 4.14 Pooled Growth Regression across Latin American countries, Central Government, 1994-2010

| | Fixed Effects | GMM | Baseline specification | Trade added | Foreign direct investment added | Informal employment added | Poverty added | Time to start a business added | Expenditure per student added | Health expenditure per capita added | R&D expenditure added | Roads paved added | Internet added |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **VARIABLES** | | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| **Fiscal policy variables** | | | | | | | | | | | | | |
| **Revenue** | | | | | | | | | | | | | |
| Direct tax (Corporate) | -208.85 | 20.34* | -208.85 | -281.07 | -333.68 | -188.76 | -259.71 | -209.74 | -267.93 | -181.10 | -550.70* | -232.76 | -247.15 |
| | (229.31) | (12.20) | (264.87) | (215.04) | (279.01) | (247.17) | (252.17) | (265.25) | (285.95) | (243.64) | (290.88) | (264.93) | (221.48) |
| Indirect tax | -42.87 | -8.85 | -42.87 | -0.98 | -36.62 | -16.91 | -80.83 | -50.96 | -54.67 | -54.78 | -42.74 | 41.78 | -35.02 |
| | (106.00) | (43.18) | (75.44) | (67.19) | (73.68) | (63.57) | (78.65) | (74.82) | (70.21) | (78.99) | (70.58) | (86.02) | (67.64) |
| **Expenditure** | | | | | | | | | | | | | |
| Aquisition of fixed assets | -0.62** | 0.12 | -0.62*** | -0.70*** | -0.59** | -0.60** | -0.57** | -0.63*** | -0.59** | -0.55** | -0.41* | -0.70*** | -0.51* |
| | (0.29) | (0.17) | (0.21) | (0.19) | (0.22) | (0.25) | (0.20) | (0.19) | (0.24) | (0.20) | (0.23) | (0.18) | (0.28) |
| Capital transfers | 0.37 | 0.25 | 0.37* | -0.00 | 0.44* | 0.31 | 0.40* | 0.40 | 0.43* | 0.47** | 0.53* | 0.27 | 0.33** |
| | (0.45) | (0.18) | (0.21) | (0.28) | (0.25) | (0.25) | (0.21) | (0.25) | (0.23) | (0.16) | (0.30) | (0.21) | (0.15) |
| **Control variables** | | | | | | | | | | | | | |
| Real gdp per capita | -3.36 | 6.67 | -3.36 | -3.67 | -2.90 | -3.87 | -2.24 | -3.16 | -2.77 | -1.64 | -3.23 | -3.54 | -1.90 |
| | (3.22) | (82.97) | (4.05) | (3.31) | (4.11) | (4.07) | (3.83) | (4.23) | (4.09) | (5.71) | (5.46) | (3.98) | (4.97) |
| Life expectancy | 23.92 | 9.74 | 23.92 | -7.50 | 28.61 | 15.43 | 25.23 | 24.57 | 28.99 | 17.07 | 16.48 | 23.41 | 25.39 |
| | (21.00) | (14.44) | (23.44) | (24.05) | (21.36) | (21.80) | (22.48) | (23.87) | (30.67) | (21.23) | (22.01) | (20.91) | (24.64) |
| Population growth | -94.32 | -1.85 | -94.32 | -75.20 | -85.76 | -61.82 | -103.82 | -98.97 | -109.04 | -107.92 | -82.68 | -82.12 | -65.82 |
| | (93.15) | (30.12) | (91.35) | (66.97) | (76.53) | (85.66) | (93.68) | (90.46) | (78.27) | (80.37) | (113.56) | (98.55) | (122.29) |
| Primary education enrollment | -3.44*** | -1.18** | -3.44*** | -2.96*** | -3.69*** | -3.13*** | -3.51*** | -3.46*** | -3.43*** | -3.43*** | -3.44*** | -3.45*** | -3.50*** |
| | (0.92) | (0.53) | (0.58) | (0.62) | (0.42) | (0.72) | (0.56) | (0.60) | (0.58) | (0.64) | (0.76) | (0.60) | (0.65) |
| Trade | | | | 4.77*** | | | | | | | | | |
| | | | | (0.88) | | | | | | | | | |
| Foreign direct investment | | | | | 9.88** | | | | | | | | |
| | | | | | (3.47) | | | | | | | | |
| Informal employment | | | | | | -6.87* | | | | | | | |
| | | | | | | (3.34) | | | | | | | |
| Poverty | | | | | | | 2.09** | | | | | | |
| | | | | | | | (0.79) | | | | | | |
| Time to start a business | | | | | | | | -8.55 | | | | | |
| | | | | | | | | (19.81) | | | | | |
| Expenditure per student | | | | | | | | | -1.69 | | | | |
| | | | | | | | | | (3.25) | | | | |
| Health expenditure per capita | | | | | | | | | | -1.39 | | | |
| | | | | | | | | | | (2.45) | | | |
| R&D expenditure | | | | | | | | | | | 0.61 | | |
| | | | | | | | | | | | (1.16) | | |
| Roads paved | | | | | | | | | | | | 8.68** | |
| | | | | | | | | | | | | (3.59) | |
| Internet | | | | | | | | | | | | | -0.10 |
| | | | | | | | | | | | | | (2.76) |
| Observations | 175 | 187 | 175 | 175 | 175 | 175 | 175 | 175 | 168 | 175 | 148 | 175 | 161 |
| Number of countries | 10 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 12 | 13 | 11 | 13 | 12 |
| F - statistic | 6.995*** | 9.844*** | 15601*** | 19065*** | 8444*** | 237736*** | 13272*** | 18756*** | 17133*** | 21123*** | 285126*** | 1618*** | 49909*** |
| R - squared | 0.549 | --- | 0.549 | 0.603 | 0.556 | 0.563 | 0.553 | 0.549 | 0.556 | 0.551 | 0.560 | 0.558 | 0.562 |

Notes: Dependent variable is real GDP per capita annual percentage growth rate. All explanatory variables are lagged by one year. Annual data for 1994-2010. All regressions also contain year dummies. Standard errors, adjusted for clustering at the country level, are reported in parentheses. The estimators used are Fixed Effects, system GMM and the Discroll and Kraay (1998) which accounts for fixed cross-sectional effects, autocorrelation, heteroskedasticity and cross sectional dependence. ***(**/*) denotes statistically significant at the 1%(5%/10%). Countries included are: Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela

## Table 4.15 Fisher Unit Root Test

| Unit Root Test | I chi-squared | p-value |
|---|---|---|
| Growth | 85.89 | 0.00 |
| Taxes on income | 107.94 | 0.00 |
| Taxes on payroll | 77.73 | 0.00 |
| Other taxes | 113.66 | 0.00 |
| Government consumption | 112.40 | 0.00 |
| Trade | 111.24 | 0.00 |
| Foreign direct investment | 140.45 | 0.00 |
| Informal employment | 96.33 | 0.00 |
| Poverty | 100.82 | 0.00 |
| Time to start a business | 73.59 | 0.00 |
| Expenditure per student | 115.13 | 0.00 |
| Health expenditure per capita | 68.46 | 0.00 |
| R&D expenditure | 75.57 | 0.00 |
| Roads paved | 96.42 | 0.00 |
| Internet | 36.47 | 0.45 |

## Table 4.16 Heteroskesdasticity Test

| Test | Value | p-value |
|---|---|---|
| Mod. Wald test | 92.70 | 0.00 |

## Table 4.17 Collinearity Test

| | Collinearity statistics | |
|---|---|---|
| VARIABLES | Tolerance | VIF |
| Taxes on income | 0.42 | 2.41 |
| Taxes on payroll | 0.61 | 1.65 |
| Other taxes | 0.61 | 1.64 |
| Government consumption | 0.47 | 2.13 |
| Real gdp per capita | 0.30 | 3.34 |
| Life expectancy | 0.44 | 2.30 |
| Population growth | 0.39 | 2.60 |
| Primary education enrollment | 0.37 | 2.70 |

# Table 4.18 Pooled Growth Regression across Latin American countries, General Government, 1994-2010

| | Fixed Effects | GMM | Baseline specification | Trade added | Foreign direct investment added | Informal employment added | Poverty added | Time to start a business added | Expenditure per student added | Health expenditure per capita added | R&D expenditure added | Roads paved added | Internet added |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **VARIABLES** | | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| **Fiscal policy variables** | | | | | | | | | | | | | |
| **Revenue** | | | | | | | | | | | | | |
| Taxes on income | -0.02 | 19.64** | -0.02 | -0.03* | -0.02 | -0.04** | -0.02 | -0.03 | -0.02 | -0.02 | -0.03** | -0.02 | -0.03*** |
| | (0.02) | (9.20) | (0.01) | (0.02) | (0.01) | (0.02) | (0.01) | (0.02) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| Taxes on payroll | -0.00 | 3.41 | -0.00 | 0.03 | 0.00 | -0.06 | -0.01 | 0.00 | -0.00 | -0.01 | 0.02 | 0.04 | 0.06 |
| | (0.07) | (3.49) | (0.08) | (0.08) | (0.07) | (0.08) | (0.07) | (0.07) | (0.08) | (0.08) | (0.13) | (0.09) | (0.13) |
| Other taxes | -0.04 | -5.57 | -0.04 | -0.05 | -0.03 | -0.04 | -0.09 | -0.02 | -0.03 | -0.05 | -0.11 | -0.01 | 0.00 |
| | (0.15) | (6.37) | (0.12) | (0.10) | (0.12) | (0.08) | (0.12) | (0.12) | (0.10) | (0.13) | (0.20) | (0.11) | (0.12) |
| **Expenditure** | | | | | | | | | | | | | |
| Government consumption | -0.03** | -0.01 | -0.03 | -0.03 | -0.03 | -0.03 | -0.02 | -0.03 | -0.03 | -0.02 | -0.03 | -0.03 | -0.03 |
| | (0.01) | (0.00) | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) |
| **Control variables** | | | | | | | | | | | | | |
| Real gdp per capita | -2.43 | -110.49 | -2.43 | -1.45 | -2.50 | -2.20 | -1.92 | -1.09 | -2.36 | -1.46 | -4.29 | -1.26 | -2.94 |
| | (4.43) | (84.94) | (4.28) | (3.75) | (4.20) | (4.49) | (4.39) | (5.36) | (4.24) | (5.46) | (6.93) | (4.53) | (5.66) |
| Life expectancy | 28.47 | 8.54 | 28.47 | 12.50 | 31.95 | 23.33 | 42.81 | 37.18 | 26.50 | 23.65 | 25.92 | 24.32 | 40.57 |
| | (31.51) | (17.00) | (25.99) | (21.41) | (25.56) | (31.66) | (28.27) | (29.79) | (27.95) | (23.26) | (34.82) | (23.38) | (34.09) |
| Population growth | 41.59 | -12.21 | 41.59 | 78.97 | 38.19 | 114.27 | 29.71 | 27.23 | 41.97 | 34.12 | 61.78 | 37.39 | 76.06 |
| | (97.90) | (32.18) | (99.02) | (80.17) | (100.13) | (128.58) | (99.24) | (105.70) | (97.07) | (94.79) | (96.75) | (104.47) | (160.17) |
| Primary education enrollment | -3.07*** | -0.30 | -3.07*** | -3.08*** | -3.12*** | -2.76** | -2.82** | -2.92** | -3.05** | -3.12*** | -3.11*** | -3.66*** | -2.84** |
| | (1.12) | (0.57) | (1.01) | (1.04) | (1.01) | (1.02) | (1.15) | (1.17) | (1.08) | (1.02) | (1.02) | (0.76) | (1.02) |
| Trade | | | | 3.45*** | | | | | | | | | |
| | | | | (0.74) | | | | | | | | | |
| Foreign direct investment | | | | | 2.92 | | | | | | | | |
| | | | | | (2.45) | | | | | | | | |
| Informal employment | | | | | | -20.59*** | | | | | | | |
| | | | | | | (5.90) | | | | | | | |
| Poverty | | | | | | | 5.24*** | | | | | | |
| | | | | | | | (1.78) | | | | | | |
| Time to start a business | | | | | | | | -19.87 | | | | | |
| | | | | | | | | (29.23) | | | | | |
| Expenditure per student | | | | | | | | | 0.52 | | | | |
| | | | | | | | | | (3.63) | | | | |
| Health expenditure per capita | | | | | | | | | | -0.97 | | | |
| | | | | | | | | | | (2.03) | | | |
| R&D expenditure | | | | | | | | | | | 2.52 | | |
| | | | | | | | | | | | (1.87) | | |
| Roads paved | | | | | | | | | | | | 9.69* | |
| | | | | | | | | | | | | (5.40) | |
| Internet | | | | | | | | | | | | | 3.98 |
| | | | | | | | | | | | | | (5.02) |
| Observations | 129 | 138 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 114 | 129 | 114 |
| Number of countries | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 8 | 9 | 8 |
| F - statistic | 9.508e+06*** | 6.292*** | 9.508e+06*** | 1.785e+06*** | 3.688e+06*** | 72169*** | 119076*** | 182639*** | 277191*** | 353914*** | 145449*** | 103634*** | 1.024e+06*** |
| R - squared | 0.486 | --- | 0.486 | 0.534 | 0.487 | 0.524 | 0.504 | 0.488 | 0.486 | 0.488 | 0.528 | 0.502 | 0.520 |

Notes: Dependent variable is real GDP per capita annual percentage growth rate. All explanatory variables are lagged by one year. Annual data for 1994-2010. All regressions also contain year dummies. Standard errors, adjusted for clustering at the country level, are reported in parentheses. The estimators used are Fixed Effects, system GMM and the Discroll and Kraay (1998) which accounts for fixed cross-sectional effects, autocorrelation, heteroskedasticity and cross sectional dependence. ***(**/*) denotes statistically significant at the 1%(5%/10%). Countries included are: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela

### 4.2.3 Unemployment

In this section, the proposed panel data model will be applied to my sample, with the aim of determining the fiscal policy mix in two levels of government during the period of study and its impact on economic development. This empirical estimation analyses the development of unemployment as a function of taxes, expenditures and a set of control variables such as: lagged value of real GDP per capita, growth, minimum wage, life expectancy, population growth and primary education enrollment.

My estimations for countries were done considering cross-sectional dependence estimator which allowed me to account for autocorrelation and cross-sectional dependence (Table 4.14 for central government and Table 4.18 for general government). The variables added in my robustness checks are: trade, foreign direct investment, informal employment, poverty, time to start a business, expenditure per student, health expenditure per capita, R&D expenditure, roads paved and internet. The specification tests are included before the regressions.

Taxes are not significant in the central government but when analysing the General Government, other taxes show a significant and positive effect on unemployment which is consistent with the explanation given in section 3.2.1. Additionally, current expenditure is positive and significant while acquisition of fixed assets presents fixed results in the central government. However, government consumption increases unemployment considering the general government.

Turning to other regressors, minimum wage impacts negatively unemployment, while life expectancy has a positive effect when considering the central government.

## Table 4.19 Fisher Unit Root Test

| Unit Root Test | I chi-squared | p-value |
|---|---|---|
| Unemplpoyment | 85.89 | 0.00 |
| Direct tax (Corporate) | 50.38 | 0.03 |
| Indirect tax | 119.14 | 0.00 |
| Other current expenditure | 218.41 | 0.00 |
| Aquisition of fixed assets | 90.80 | 0.00 |
| Trade | 111.24 | 0.00 |
| Foreign direct investment | 140.45 | 0.00 |
| Informal employment | 96.33 | 0.00 |
| Poverty | 100.82 | 0.00 |
| Time to start a business | 73.59 | 0.00 |
| Expenditure per student | 115.13 | 0.00 |
| Health expenditure per capita | 68.46 | 0.00 |
| R&D expenditure | 75.57 | 0.00 |
| Roads paved | 96.42 | 0.00 |
| Internet | 36.47 | 0.45 |

## Table 4.20 Heteroskesdasticity Test

| Test | Value | p-value |
|---|---|---|
| Mod. Wald test | 128.98 | 0.00 |

## Table 4.21 Collinearity Test

| | Collinearity statistics | |
|---|---|---|
| VARIABLES | Tolerance | VIF |
| Direct tax (Corporate) | 0.83 | 1.21 |
| Indirect tax | 0.66 | 1.52 |
| Other current expenditure | 0.94 | 1.06 |
| Aquisition of fixed assets | 0.62 | 1.63 |
| Real gdp per capita | 0.33 | 3.06 |
| Minimum wage | 0.78 | 1.28 |
| Life expectancy | 0.32 | 3.15 |
| Population growth | 0.50 | 2.00 |
| Primary education enrollment | 0.32 | 3.09 |

# Table 4.22 Pooled Unemployment Regression across Latin American countries, Central Government, 1994-2010

| | Fixed Effects | GMM | Baseline specification | Trade added | Foreign direct investment added | Informal employment added | Poverty added | Time to start a business added | Expenditure per student added | Health expenditure per capita added | R&D expenditure added | Roads paved added | Internet added |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **VARIABLES** | | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| **Fiscal policy variables** | | | | | | | | | | | | | |
| **Revenue** | | | | | | | | | | | | | |
| Direct tax (Corporate) | 0.08* | 3.04* | 0.08 | 0.08 | 0.08 | 0.08 | 0.06 | 0.13** | 0.05 | 0.06 | 0.08 | 0.08 | 0.06 |
| | (0.04) | (1.68) | (0.06) | (0.06) | (0.07) | (0.06) | (0.05) | (0.06) | (0.06) | (0.05) | (0.08) | (0.06) | (0.07) |
| Indirect tax | -0.69 | -83.96*** | -0.69 | -0.71 | -0.76 | -0.94 | -1.76 | 1.27 | 0.13 | -1.73 | 0.10 | 0.61 | -0.65 |
| | (3.81) | (12.71) | (3.08) | (3.22) | (3.21) | (2.95) | (2.97) | (3.31) | (4.01) | (2.76) | (2.98) | (3.70) | (3.57) |
| **Expenditure** | | | | | | | | | | | | | |
| Other current expenditure | 0.41*** | 0.74*** | 0.41** | 0.41** | 0.41** | 0.41** | 0.39* | 0.46** | 0.41** | 0.28 | 0.31 | 0.42** | 0.45** |
| | (0.14) | (0.07) | (0.18) | (0.18) | (0.18) | (0.18) | (0.19) | (0.19) | (0.19) | (0.18) | (0.24) | (0.19) | (0.17) |
| Aquisition of fixed assets | -0.05 | -0.18*** | -0.05 | -0.06 | -0.06 | -0.07 | -0.06 | 0.00 | -0.07 | -0.10** | -0.14*** | -0.07 | -0.07 |
| | (0.05) | (0.02) | (0.06) | (0.07) | (0.07) | (0.07) | (0.05) | (0.06) | (0.09) | (0.05) | (0.04) | (0.07) | (0.07) |
| **Control variables** | | | | | | | | | | | | | |
| Real gdp per capita | -0.85 | -150.19*** | -0.85* | -0.81* | -0.87* | -0.81 | -0.61 | -1.43*** | -0.40 | -2.30*** | -0.33 | -0.95** | -0.82* |
| | (0.56) | (10.83) | (0.43) | (0.46) | (0.41) | (0.49) | (0.40) | (0.41) | (0.34) | (0.68) | (1.07) | (0.41) | (0.43) |
| Minimum wage | -33.70*** | -1.32*** | -33.70*** | -36.12*** | -34.51*** | -32.48** | -34.10** | -22.01** | -51.73*** | -32.55** | -38.16** | -33.04** | -38.02** |
| | (11.21) | (0.08) | (10.97) | (11.22) | (11.51) | (11.24) | (11.74) | (7.97) | (6.46) | (11.90) | (13.70) | (12.24) | (15.02) |
| Life expectancy | 12.18** | 53.86*** | 12.18** | 13.03*** | 11.65** | 11.83** | 12.72** | 6.03* | 13.55*** | 18.72*** | 10.61 | 12.06** | 13.72** |
| | (4.85) | (2.30) | (4.18) | (3.97) | (4.53) | (4.09) | (4.33) | (3.21) | (4.34) | (3.73) | (6.34) | (4.49) | (5.24) |
| Population growth | 3.51 | -31.16*** | 3.51 | 4.70 | 4.37 | 0.50 | -1.87 | 34.86 | 14.30 | 14.93 | 8.65 | 7.83 | 1.02 |
| | (19.25) | (3.81) | (18.49) | (17.95) | (19.10) | (16.97) | (18.91) | (24.19) | (21.70) | (19.39) | (23.93) | (19.41) | (20.81) |
| Primary education enrollment | 0.22 | -0.45*** | 0.22 | 0.21 | 0.23 | 0.19 | 0.23 | 0.20 | 0.23 | 0.10 | 0.19 | 0.22 | 0.27 |
| | (0.17) | (0.07) | (0.21) | (0.21) | (0.20) | (0.18) | (0.21) | (0.15) | (0.23) | (0.19) | (0.17) | (0.21) | (0.23) |
| Trade | | | | -0.23 | | | | | | | | | |
| | | | | (0.16) | | | | | | | | | |
| Foreign direct investment | | | | | -0.53 | | | | | | | | |
| | | | | | (0.93) | | | | | | | | |
| Informal employment | | | | | | 0.57 | | | | | | | |
| | | | | | | (0.73) | | | | | | | |
| Poverty | | | | | | | 0.45 | | | | | | |
| | | | | | | | (0.32) | | | | | | |
| Time to start a business | | | | | | | | 19.12*** | | | | | |
| | | | | | | | | (4.90) | | | | | |
| Expenditure per student | | | | | | | | | -1.43 | | | | |
| | | | | | | | | | (0.87) | | | | |
| Health expenditure per capita | | | | | | | | | | 1.08** | | | |
| | | | | | | | | | | (0.45) | | | |
| R&D expenditure | | | | | | | | | | | 0.17 | | |
| | | | | | | | | | | | (0.35) | | |
| Roads paved | | | | | | | | | | | | 1.00 | |
| | | | | | | | | | | | | (1.45) | |
| Internet | | | | | | | | | | | | | 0.23 |
| | | | | | | | | | | | | | (0.81) |
| Observations | 147 | 157 | 147 | 147 | 147 | 147 | 147 | 147 | 136 | 147 | 125 | 147 | 138 |
| Number of countries | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 12 | 13 | 11 | 13 | 12 |
| F - statistic | 3.711*** | 318.1*** | 9984*** | 26492*** | 4414*** | 13157*** | 14564*** | 19292*** | 1958*** | 24447*** | 33310*** | 2646*** | 799.4*** |
| R - squared | 0.447 | --- | 0.447 | 0.454 | 0.449 | 0.453 | 0.458 | 0.540 | 0.496 | 0.506 | 0.430 | 0.451 | 0.463 |

Notes: Dependent variable is Unemployment rate. All explanatory variables are lagged by one year. Annual data for 1994-2010. All regressions also contain year dummies. Standard errors, adjusted for clustering at the country level, are reported in parentheses. The estimators used are Fixed Effects, system GMM and the Discroll and Kraay (1998) which accounts for fixed cross-sectional effects, autocorrelation, heteroskedasticity and cross sectional dependence. ***(**/*) denotes statistically significant at the 1%(5%/10%). Countries included are: Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela

## Table 4.23 Fisher Unit Root Test

| Unit Root Test | I chi-squared | p-value |
|---|---|---|
| Unemployment | 85.89 | 0.00 |
| Taxes on income | 107.94 | 0.00 |
| Taxes on payroll | 77.73 | 0.00 |
| Other taxes | 113.66 | 0.00 |
| Government consumption | 112.40 | 0.00 |
| Trade | 111.24 | 0.00 |
| Foreign direct investment | 140.45 | 0.00 |
| Informal employment | 96.33 | 0.00 |
| Poverty | 100.82 | 0.00 |
| Time to start a business | 73.59 | 0.00 |
| Expenditure per student | 115.13 | 0.00 |
| Health expenditure per capita | 68.46 | 0.00 |
| R&D expenditure | 75.57 | 0.00 |
| Roads paved | 96.42 | 0.00 |
| Internet | 36.47 | 0.45 |

## Table 4.24 Heteroskesdasticity Test

| Test | Value | p-value |
|---|---|---|
| Mod. Wald test | 40.24 | 0.00 |

## Table 4.25 Collinearity Test

| | Collinearity statistics | |
|---|---|---|
| VARIABLES | Tolerance | VIF |
| Taxes on income | 0.38 | 2.63 |
| Taxes on payroll | 0.60 | 1.66 |
| Other taxes | 0.57 | 1.76 |
| Government consumption | 0.52 | 1.94 |
| Real gdp per capita | 0.30 | 3.34 |
| Minimum wage | 0.71 | 1.41 |
| Life expectancy | 0.43 | 2.33 |
| Population growth | 0.33 | 2.99 |
| Primary education enrollment | 0.35 | 2.87 |

# Table 4.26 Pooled Unemployment Regression across Latin American countries, General Government, 1994-2010

| | Fixed Effects | GMM | Baseline specification | Trade added | Foreign direct investment added | Informal employment added | Poverty added | Time to start a business added | Expenditure per student added | Health expenditure per capita added | R&D expenditure added | Roads paved added | Internet added |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **VARIABLES** | | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| **Fiscal policy variables** | | | | | | | | | | | | | |
| **Revenue** | | | | | | | | | | | | | |
| Taxes on income | 0.20 | -9.34*** | 0.20 | 1.57 | -0.33 | 0.41 | 0.25 | 3.80* | 0.04 | 0.20 | -0.26 | 0.17 | -0.20 |
| | (2.12) | (1.04) | (1.65) | (1.39) | (1.55) | (2.23) | (1.67) | (1.80) | (1.36) | (1.68) | (2.01) | (1.63) | (2.04) |
| Taxes on payroll | -1.36 | -1.10** | -1.36 | -2.05 | -2.06 | -1.24 | -1.46 | -0.93 | 1.27 | -1.69 | -1.09 | -1.38 | -0.74 |
| | (1.46) | (0.43) | (1.89) | (2.30) | (1.92) | (2.12) | (1.92) | (1.36) | (2.21) | (1.82) | (2.05) | (1.89) | (1.99) |
| Other taxes | 8.63*** | 4.87*** | 8.63*** | 8.87*** | 8.34*** | 8.70*** | 8.67*** | 6.93*** | 6.93*** | 8.41*** | 6.33* | 8.52*** | 7.93** |
| | (2.25) | (0.75) | (2.18) | (1.88) | (2.24) | (2.16) | (2.21) | (2.05) | (1.66) | (2.30) | (3.28) | (2.33) | (2.99) |
| **Expenditure** | | | | | | | | | | | | | |
| Government consumption | 0.97*** | 0.06 | 0.97*** | 1.06*** | 1.04*** | 0.97*** | 0.96*** | 0.87*** | 1.01*** | 0.90*** | 0.89*** | 0.97*** | 1.27*** |
| | (0.19) | (0.05) | (0.16) | (0.19) | (0.15) | (0.16) | (0.16) | (0.17) | (0.14) | (0.16) | (0.19) | (0.16) | (0.25) |
| **Control variables** | | | | | | | | | | | | | |
| Real gdp per capita | -0.11 | -116.88*** | -0.11 | -0.16 | 0.01 | -0.11 | -0.15 | -1.76* | -0.16 | -0.46 | -0.83 | -0.11 | -0.91 |
| | (0.62) | (10.68) | (0.82) | (0.78) | (0.69) | (0.83) | (0.74) | (0.88) | (0.67) | (0.99) | (0.94) | (0.80) | (0.61) |
| Minimum wage | -58.92*** | -0.84*** | -58.92*** | -63.58*** | -67.41*** | -58.73*** | -58.69*** | -39.99*** | -58.96*** | -59.25*** | -62.80*** | -58.93*** | -76.76*** |
| | (10.66) | (0.06) | (11.83) | (10.99) | (15.19) | (11.39) | (12.33) | (12.87) | (10.18) | (12.69) | (13.19) | (12.09) | (12.77) |
| Life expectancy | 10.14** | 52.03*** | 10.14* | 11.30** | 7.64 | 10.18* | 9.65* | 2.15 | 17.09*** | 12.03* | 9.32* | 10.36* | 14.11*** |
| | (4.75) | (2.24) | (4.86) | (4.22) | (4.92) | (4.92) | (5.27) | (5.87) | (5.15) | (5.69) | (4.74) | (5.54) | (4.55) |
| Population growth | 14.56 | -40.76*** | 14.56 | 8.98 | 22.98 | 13.30 | 14.73 | 15.70 | 3.41 | 18.52 | 14.04 | 15.68 | 34.70 |
| | (16.40) | (4.06) | (23.30) | (19.16) | (24.31) | (24.87) | (23.59) | (18.21) | (16.68) | (22.38) | (26.00) | (23.40) | (25.98) |
| Primary education enrollment | -0.05 | -0.64*** | -0.05 | -0.10 | -0.06 | -0.06 | -0.06 | -0.11 | -0.13 | -0.04 | -0.01 | -0.06 | 0.03 |
| | (0.16) | (0.07) | (0.15) | (0.12) | (0.16) | (0.16) | (0.14) | (0.19) | (0.15) | (0.14) | (0.14) | (0.14) | (0.12) |
| Trade | | | | -0.41** | | | | | | | | | |
| | | | | (0.15) | | | | | | | | | |
| Foreign direct investment | | | | | -2.09* | | | | | | | | |
| | | | | | (0.98) | | | | | | | | |
| Informal employment | | | | | | 0.31 | | | | | | | |
| | | | | | | (1.10) | | | | | | | |
| Poverty | | | | | | | -0.16 | | | | | | |
| | | | | | | | (0.46) | | | | | | |
| Time to start a business | | | | | | | | 18.75*** | | | | | |
| | | | | | | | | (4.45) | | | | | |
| Expenditure per student | | | | | | | | | -2.41** | | | | |
| | | | | | | | | | (1.06) | | | | |
| Health expenditure per capita | | | | | | | | | | 0.30 | | | |
| | | | | | | | | | | (0.28) | | | |
| R&D expenditure | | | | | | | | | | | 0.52* | | |
| | | | | | | | | | | | (0.26) | | |
| Roads paved | | | | | | | | | | | | 0.35 | |
| | | | | | | | | | | | | (1.57) | |
| Internet | | | | | | | | | | | | | 1.91** |
| | | | | | | | | | | | | | (0.71) |
| Observations | 111 | 118 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 102 | 111 | 102 |
| Number of countries | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 8 | 9 | 8 |
| F - statistic | 6.670*** | 314.1*** | 13790*** | 25608*** | 27616*** | 28566*** | 9206*** | 14272*** | 56393*** | 13032*** | 32684*** | 4859*** | 6920*** |
| R - squared | 0.672 | --- | 0.672 | 0.701 | 0.696 | 0.673 | 0.673 | 0.739 | 0.716 | 0.676 | 0.723 | 0.673 | 0.735 |

Notes: Dependent variable is Unemployment rate. All explanatory variables are lagged by one year. Annual data for 1994-2010. All regressions also contain year dummies. Standard errors, adjusted for clustering at the country level, are reported in parentheses. The estimators used are Fixed Effects, system GMM and the Discroll and Kraay (1998) which accounts for fixed cross-sectional effects, autocorrelation, heteroskedasticity and cross sectional dependence. ***(**/*) denotes statistically significant at the 1%(5%/10%). Countries included are: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela

### 4.2.4 Conclusion

The effect of the fiscal variables on growth and employment in Latin American countries might be offsetting because I am pooling countries which have different levels of development, but unfortunately, due to lack of data, I was unable to run separate regressions by income group. Overall my results in this section are weak since different countries have different methods of reporting and I use several sources of information with different methodological procedures. The idea of comparing two different levels of government was to be able to get an insight of the different effect of fiscal variables in each level of government but my figures are inconsistent and unreliable. As mentioned throughout my dissertation, the lack of data has been a major drawback to further comparisons. Latin America also presents corruption, weak institutional framework and informal employment. However, an interesting insight that can be derived from the analysis of Latin American countries is that in order to get better results and understand the particular reality of several economies, the local analysis of countries is essential, since the aggregate data can give misleading results. Consequently, the relevance of focalised fiscal policy turns to be fundamental to understand local development, growth and employment.

# 5. A Social Perspective of Public Finances

The first part of the chapter refers to several surveys of public opinion conducted to understand public policy, the challenges, the limitations and the use of surveys to complement statistics and public financial reports. The second part makes a general description of survey methodologies. The third part of the chapter refers to the perception "policy makers" have regarding different kinds of taxes levied and several types of expenditure utilised and their impact on GDPpc. The fourth part of the chapter refers to the opinion people have of the development of fiscal policy, tax levied, governmental resources, spending efficiency, degree of satisfaction of services provided, considering the regional surveys provided by Latinobarómetro 2008-2010.

## *5.1 Challenges and limitations of Surveys of Public Opinion*

Brooker and Schaefer (2006) emphasise that there has been a new academic interest of public opinion in order to study in a systematised way what people think about their governments. In reality, there are several channels that government leaders have in order to learn what people think about certain issues. Informal ways to measure public opinion can be elections, interest groups and lobbying, the media, letters and calls, protests and straw polls. Formal quantitative methods include sample surveys, for example, face to face interviews, telephone interviews and mail surveys. In this respect, it is important to consider the population, the sample and the randomness because if not everybody is given an equal chance of being selected, the sample can be biased. Questions addressed have to be clear and impartial. The main advantage of survey research is that it enables the projection or generalisation of the entire population. Likewise, when surveys are properly utilised, they can predict behaviour very accurately. Some drawbacks of surveys are superficiality, lack of time to reflect, not enough information and problems in operationalising the concepts of the survey. Additional quantitative methods include experiments and

mail analysis. Formal qualitative methods include in-depth interviews and focus groups which allow the researcher to understand the perspective and thought pattern of people. However, the main disadvantage of qualitative research is that results are not projectable.

According to Braun and Straw (2009), in modern politics there is a continuous a flow of information between politics, media and the general public, possible only in democratic governments. Braun (2011) considers that surveys have demonstrated to be a tool to understand the point of view of different segments of the society, to detect attitudes, preferences, values and population behaviour among very diverse societies. Research on public opinion in Latin America refers in some cases to successful management such as Ibope in Brazil, Datos in Venezuela, Admirak in Chile or Apoyo in Peru. The corporation Latinobarómetro, the Centro de Estudios Públicos or the Centro de Estudios de la Realidad Contemporánea of Chile have also been a successful approach. The importance of debates and research on public opinion can certainly enrich democracies and allow citizens get involved and feel part of their community. In order to exercise the liberty of developing surveys, a normative and legal framework has to be properly established. Moreover, surveys can democratise public action since they put in hands of the citizens relevant information and empowers them to be part of the public life.

Surveys of public opinion are a technique of social research that has reached a solid position in modern societies and they have had an increasing role in the public agenda. Surveys have become a tool to orientate the decision of public and private agents; they are used by politicians, parties and governments and are valuable to understand the opinion and trust of a society in certain topics of public interest, public policy for example (Huneeus, 2010).

In the last 15 years, we have witnessed an increment in social participation in relevant topics of public endeavour in order to promote growth, equity, social

development and consolidate the democratic system. However, Latin America is still behind compared to other developed nations. Mexico in particular, has shown some progress in its regulations and legal framework, however, effective participation of citizens and social groups is still not fully developed in the evaluation of public policies. There is still not enough experience in the promotion of social participation and low confidence in its effectiveness (Cardozo, 2008).

Tolosa et al. (2012, p.77) propose a qualitative survey addressed to experts with the aim of constructing an index that evaluates public administration continuously. Their methodology considers seven topics to analyse in a different context to financial, the perception of institutional performance. They consider a simplified survey so as to follow up responsibilities and good practices in the design of surveys of public opinion. The main result is the development of an evaluation instrument of public affairs that is alternative to financial reports and useful to understand and identify the impact of public policy in society.

De Haan et al. (2013, p.423) utilise a panel fixed-effects model to analyse 15 members of the European Union between 1984 and 2003. Their results suggest that a strong budget establishment reduces the deficit propensity and promotes fiscal discipline even in case of ideological fragmentation. Moreover, when analysing public sector reform in Denmark, Greve (2003, p.269) finds that it is important to consider the organisational transformation and evaluation of the public sector in a systematic way. Lybek and Morris (2004, p.37) conduct a survey of 101 central bank laws in 113 countries and conclude that an appropriate balance between functions of the governing entities, simplicity and country specific factors should be taken into account in order to achieve good governance that complies efficiently with the objectives, tasks and functions of the central banks.

An interesting result derived from the panel data research of Bhattacharyya and Hodler (2014, p.101) in 133 economies during the period 1970-2005 is that when countries have natural resources and weak political institutions, this combination can inhibit financial development. El Anshasy et al. (2013, p.285) analyse 79 countries from 1984 to 2008 with a panel data approach to study the relationship between natural resources, corruption and bad economic performance. Their findings show that better governance, a solid democracy, strong institutions, transparency and accountability of resources, lead to a good financial performance and higher economic growth. Eslava (2011, p.645) suggests that conflicts of interest between different groups or regions can enhance fiscal deficits. Kirchgässner, G. (2001, p.1) finds that an adequate constitutional framework and proper budget procedures are effective in promoting fiscal discipline and considers that citizens approve sound fiscal policy.

According to the work of Hayo and Neumeier (2014, p.198), recent developments in behavioural economics have showed that psychology and sociology, among other social sciences, have become useful tools to understand empirical and economic models. Their most robust finding in their panel data approach in Germany, suggests that a prime's minister socioeconomic background influences fiscal performance. Prime ministers from a poorer socioeconomic upbringing are more prone to higher public spending and debt. Jochimsen, B. and Thomasius, S. (2014, p.390) test with a dynamic panel data the personal characteristics of finance ministers in German states from 1960 to 2009 and find that their professional background and field of experience influence the fiscal position of a locality. Besides, Remund (2010, p.276) talks about the importance of strategies to improve financial literacy of public policy officials.

During the process of evaluating the public administration in Mexico, not only the quantitative measurement of goals and impact of a particular policy was considered but also some interviews of public servants in their area of influence. The effort to implement a system that periodically evaluates objectives and goals

of each federal program, has been a major development in accountability and transparency (Lira, 2005). However, according to the Ministry of Finance (SHCP, 2017), the system is developing gradually in Mexican states and municipalities during 2017 and 2018, respectively. The 2017 diagnostic of the 32 Mexican states shows that state average has a progress of 65.3 points and among the 62 municipalities of the sample, 22 have a high degree of implementation. May (2004, p.1) describes that Ministers of Finance have to prioritise the allocation of resources among different suitable options, have to identify the optimal policy, provide evidence for their macroeconomic strategy, consider diverse scenarios and long-term impact. In this respect, the involvement of civil society in the formulation and monitoring of public policies is essential for the provision of the expected outcomes.

## *5.2 Survey methodologies at a glance*

Small surveys can give a rough idea of what people think instead of guessing. They are most commonly used to collect data. Surveys are even considered as social research because they require collection of information from individuals with a structured questionnaire. In developing countries, surveys are applied in person, by telephone or mail and respondents are carefully selected. The number of questions and the population sample is typically kept small. Probability sample would be desirable but sometimes it is not possible because of time and cost constraints. Among the advantages of mini surveys, we can find that they are fast, require low time to be completed and analysed, present minimum errors and provide low cost; while their disadvantages are that is it not possible to generalise, or make thorough statistical analysis and credibility. Mini surveys are not a substitute for large surveys that study social and economic phenomena, however, they are useful when there is limited time and resources. Mini surveys can be a preface for more developed surveys. There are basically seven steps to develop a Mini Survey: 1) Formulate a study objective 2) Review the literature 3) Prepare survey questions 4) Design the questionnaire 5) Choose the type of sampling 6) Choose the mode of contact and 7) Analyse the data. (Kumar, 1990,

p.1-8).

However, bigger scale surveys can be conducted for a broader analysis in order to understand particular financial and economic activity. Graham and Harvey (2001, p. 187-191, p.232) survey 392 Chief Financial Officers (CFOs) regarding the cost of capital, capital budgeting, and capital structure (9% response rate). Their findings show that large companies rely on Net Present Value (NPV) and Capital Asset Pricing Model (CAPM) while small firms use the payback principle. A considerable number of companies evaluate firm instead of project risk when considering new investments. Corporations ponder financial flexibility and credit ratings when making debt decisions. In a pilot survey, Duke University Graduate MBA students provided feedback to make corrections, so the final survey contained 15 questions. The survey was delivered by mail to each CFO in the 1998 Fortune 500 list. The Financial Executives Institute faxed out 4,440 surveys to their members. To encourage the rate of response, they offered copy of the results. The sample of companies contrast from very small (26%) with sales of less than $100 million, to very large (42%) that have sales of at least $1 billion. Their results confirm that small companies are less sophisticated when evaluating risky projects.

Moran et al. (2007, p.42-45), contrast two different methods for determining priorities in agri-environmental Scottish policy. Multifunctional agriculture establishes a new balance among traditional commodity support and the payment for manufacturing non-market goods. The latter presents inconveniences for optimal policy design. Considering public focus groups, certain key characteristics were established of Scottish public's preferences for agri-environmental reform. This information was combined in two separate survey methods using the analytical hierarchy process and choice experiments. Their results suggest that people is willing to pay for environmental and social benefits.

Pollitt, C. (1995, p.149-151) considers that there are underpinnings of the new public management because further analysis needs to be made regarding benchmarking, properly quantification of costs, inequity in the provision of public services, self-interest and dishonest behaviour, organised crime and corruption. Therefore, large-scale surveys to public service government officials and citizens should be undertaken in a systematised way over a long period of time. Furthermore, considering the difference among localities, low income localities population may lack the time and resources to make good decisions and do not have enough experience to evaluate adequately certain service delivery (Abadzi, 2013, p.115). Hence, local governments must understand the provision of public services within the context of people of limited literacy.

Garb et al. (2007, p.3), develop 32 Environmental Impact Assessment in order to evaluate the prospective effects of certain policy measures on the natural environment. These types of instruments are useful to ponder the realisation of certain project or not, involving complex trade-offs among natural resources, society and economy i.e. a new highway that is planned to run through a natural reserve that can alter endangered species and affect local inhabitants; the preventive measures for the development of a new airport which generates high pollution and affects the surrounding environment.

A topic that has increasingly brought attention is the role of corruption in the health sector, therefore, policymakers should establish certain parameters to make the process of service delivery to the population transparent and monitorable to fight corruption in the health sector. Behavioural scientists describe the individual and social characteristics which influence the behaviour of government agents and individuals. Vian, T. (2008, p.83) describes several methodologies that measure how opportunities and pressures motivate corruption in the health sector.

## 5.3 Mexican *framework*

Mexico has a complex network of intergovernmental fiscal relations with a high degree of centralization of public revenue and with limited taxing powers for states and municipalities. Own income for the latter is limited, which poses an extremely complex situation in terms of the resources that are available to perform public expenditure. During 1988 and as part of an exercise in strengthening federalism and modernization of the states in Mexico, the federal government promoted a strategy of decentralization to encourage a balanced regional development by the coordination between both the federal and state levels as explained in chapter four.

Mexico has been promoting during the last decades a scheme for greater autonomy, fiscal responsibility and accountability for their local governments. Article 40 of the Political Constitution of the United Mexican States provides that "it is the will of the Mexican people to become a Republic representative, democratic, federal, composed of free and sovereign states in everything concerning his regime inside but states in a Federation". Each entity has its own Constitution, which is subject to the Federal Constitution. Within each state the municipalities are autonomous, with capacity to manage freely their finance, which integrates with the contributions on the ownership of real estate, the federal shares and the income derived from the provision of public services (Amieva-Huerta, 2002).

Regarding budget design, it is relevant to consider not only fiscal planners' perspectives, but also the particular needs of the local population, since they must be satisfied with the services provided by their local government. Sørensen (1995 p.137-138) stated that spending preferences are related to existing public service levels and the demographic characteristics of the local population. Certain parties influence politicians' resource allocations, considering legislative committees and public-sector employment framework, therefore, the demand function of local spending is multi-dimensional. In this current work, I aim to

link the actual revenue and spending figures from the 32 Mexican States to the perception people have of taxes levied and government spending, considering the regional survey provided by Latinobarómetro 2008, 2009 and 2010. Moreover, a survey has been conducted in the 32 Mexican States to understand the opinion of government officials with respect the tax-expenditure mix, therefore, this analysis will allow me to somehow link voter's preference to politician preferences and actual public service satisfaction.

Governments in different countries function within diverse types of democracy, institutions and degrees of participation by citizens. The national, state and local framework for citizens is much more complex than it used to be decades ago. In addition, the relationship between economic performance and the size of the public sector is positive when additional infrastructure and labour is required to reach an optimal production in a given economy. This means that if a government is too small, more infrastructure would be necessary in order to provide the population with the necessary public services, generate more employment and be able to increase productivity of the economy measured as GDP per capita. However, production will only increase until it reaches a maximum and beyond that point a negative effect is reached, where government activity offsets the positive performance. Regarding which, developed economies seem to have reached the negative situation (Mueller, 2003, p.530-531, 560). As this current thesis suggest, the satisfaction of services provided, accountability and transparency of the use of resources are vital ingredients in order to achieve compliance with the taxation regime and hence, increase government revenue. This in turn could generate a virtuous circle, major accountability and transparency, major credibility, major tax compliance and better services provided. This current study will illustrate that lack of confidence in the local government is related with lower levels of growth.

In recent years, there has been a systematic deterioration in local public finances in several Mexican states and municipalities, therefore there was a need to amend the Constitution (Article 73) in order to enact fiscal responsibility laws that

would enable states and municipalities acquire healthy, sound and sustainable public finances (Diario Oficial de la Federación 25/05/2015). Moreover, the Congress approved the "Law of Financial Discipline for States and Municipalities" in March 2016, which entered into force on April 27 of 2016. The main objectives of this law are to promote sustainable local finances, establish rules of financial discipline, the responsible use of indebtedness and transparency. This legislation allows local finances to be sustainable in the medium and long-term. Citizens can have access to the public information regarding debt levels of all local public entities which have contracted debt. This law lowers the cost of funding for responsible local governments. The Law of Financial Discipline allows Mexicans to monitor the use of public resources and have a better idea of how debt in their state or municipality is being invested. (Diario Oficial de la Federación 27/04/2016). The process of implementation of this law, has been gradual in local states and municipalities during 2017 but it is important in order to improve accountability, transparency and the responsible use of resources.

According to Zamora Saenz (2017, p.2), Mexico has a grade of 30 points in the public-sector corruption perception index of Transparency International. Corruption is the 6$^{th}$ most important problem in the country as stated by Mexican citizens. Three out of ten Mexicans were affected in 2016 by a corruption act. Fifty-five percent of the affected population, had a corruption issue in relation to public security. Forty-three percent of the interviewed population is willing to pay money to have an agile public service. Furthermore, María Amparo Casar, President of "Mexicans against Corruption and Impunity" demands justice for the 11 prosecuted ex-governors that have been charged of money laundering, organised crime, operations with resources of illicit origin, diversion of funds, influence trading and abuse of functions (Becerril, 2017, p.1). Although this work does not explicitly measure corruption or has a variable that attempts to quantity it, the fact that my analysis shows low confidence and trust in local governments, could be explained by lack of transparency, accountability and corruption in local governments.

Moreover, on July 2016 new anti-corruption legislation is introduced: The General Law of Administrative Liabilities, the General Law of the National Anti-Corruption System, the Organic Law of the Administrative Justice Federal Court, and the Federal Accounting and Accountability Law. Additional reforms have been implemented in existing legislation such as the Federal Criminal Code, the Organic Law of the Federal Public Administration, among others. Some of these anti-corruption measures were first presented to the Congress at the beginning of 2016 through a citizen petition process promoting transparency in the public sector (Sean Hecker et al., 2016, p.1). In the first control system plenary meeting during June 2017, the Auditor General of Mexico, condemned the fraudulent attempts by local governments to hide their real budget circumstances and compromised with transparency, accountability and sound public finances (Red por la Rendición de Cuentas, 2017, p.8).

For the first time in Mexico, during 2009 the Government Survey of Public Security and Justice is launched. Its objective is to collect, generate and distribute information of local public administration and offer timely specialised information with good quality and design. This survey would be a tool for the design of public policy at a municipal level, their organisational structure, their regulatory framework and their process for public security and justice (INEGI, 2017). Although this survey is important to understand local organisation, the focus is mainly for security and justice, therefore, the Mini Survey I conduct with Ministries of Finance is a noteworthy attempt to understand their opinion regarding local finances. Numbers and reports are a valuable tool for measuring the development of local public finances, however, it is sensible to take into account the perspective of decision makers which are involved in the process of budgeting and spending.

Although I didn´t find in the literature another similar survey as the one I conducted in this work, in my professional experience in several local ministries in Mexico (Veracruz, Mexico City and Tamaulipas), the involvement of local

public servants with the mission and vision of the Ministry, the proper and adequate functional and administrative organisation and the synergies developed within different areas (revenue, spending, audit, control and legal teams) are a vital ingredient in the success of local fiscal policy. The role of the Minister as a leader, his background and experience, is substantial in the accomplishment of sound public finances. In the next section, I will explain in further detail how do I develop my survey.

This present study considers people´s satisfaction with the services provided in Mexican states during the period 1998-2010, finding that around 50% of the people in the 162 localities included in the Latinobarómetro surveys do not think that paying taxes makes them good citizens. Moreover, about 70% of the people interviewed do not trust or have little confidence on the local government. For half of the people considered in the surveys, the satisfaction with municipal service provision is marginal or people is not satisfied with overall services.

### 5.3.1 Rationale of the Survey

Legislation cannot be isolated from the manner that resources are received and channelled in practice. Therefore, as an exercise to link public finances with growth I conduct a survey in the 32 Mexican states to understand the opinion of government officials with respect to the tax-expenditure mix. The survey is carried out during 2014-2015 and administered by the author, after considering suggestions of field-experts from INEGI in Mexico. In the meetings held with experts of INEGI during 2013, they told me that it was not until 2011 that the National Census of Governmental Municipalities was made, although a pilot survey of security and justice was held in 2009. The objective of INEGI's survey is to collect and disseminate statistical information regarding management and performance of public institutions at a municipal level, in order to be able to monitor and evaluate government activities. However, questions are mostly related to administrative procedures and not to financial issues.

Conversely, the intention of my survey is actually to address several sources of revenue and expenditure, and listen to governmental official voice regarding their perspective on the impact of fiscal policy variables on growth. Financial and periodic reports of local public finances are available through the Congress, the Ministry of Finance, the Institute of Technical Development of the Public Budget (INDETEC) or the National Institute of Statistics and Geography, though, they are most likely to be analysed and discussed by technicians and experts in public affairs. A more approachable and friendly description of the most relevant issues in local public finances can be found in diverse media, research institutes or consultancy firms, nonetheless, a systematic follow up through surveys to public finance government officials could be considered as an additional tool for understanding the context of local public finances.

Objective of my survey: Understand the perception of fiscal policy makers with respect to certain income and expenditure components and their impact on growth.

Preparation and design of survey questions: I interviewed José Luis Guzmán Tellez, in charge of the sociodemographic surveys and administrative registers in the National Institute of Statistics and Geography and Gabriel Quintero Ramírez, advisor in statistics and attention to the public. I held 5 interviews in July and August of 2013 with Mr. Guzmán Tellez. He told me which questions were not clear in order to make them more precise and specific. During the same period, I had 2 talks with Mr. Quintero Ramirez to consider his recommendations in making my survey clearer and understandable. Additionally, throughout the last quarter of 2013, I questioned Juan Amieva Huerta (former Minister of Finance of Veracruz), Silvano Espíndola (former Treasurer of Mexico City's Ministry of Finance), Luis Octavio Alvarado (former Chief of Advisors of the Mexican State Ministry), Luis García Sotelo (former Director of the Institute of Technical Development of the Public Budget) and Alejandro Pérez Hernández (Undersecretary of Tax Administration in Mexico City´s Ministry of Finance) to

receive their feedback in relation to my survey and have a more in-depth understanding of their own personal experience in the public administration with respect to the decision making process.

Informal sampling and mode of contact: I decided to contact the 32 Ministries of Finance and the chief advisor in the state local governments. Considering time and cost constraints, I distributed the survey by email and made telephone calls in order to assure that my email had been received.

Among the questionnaires I directed to the Ministers of Finance and chiefs of advisors, there was a considerable amount of distrust of several local government officials regarding the real purpose of my survey. Only 25 percent of the states where covered and the other 75 percent were reluctant to provide any information at all. Amongst the Ministers of Finance and their staff, forty-four questionnaires were completed. The reduced size of my sample does not allow me to develop further data or regression analysis and the results cannot be generalised. This survey has been useful to have an insight of a few policy makers' perception concerning the income-expenditure mix but certainly can be an outline to a more in-depth analysis and research development. For instance, it would be desirable to analyse weather their perception of the tax-mix matches the actual figures and to extend the survey to organisational income-expenditure teams so the consistency of the fiscal policy can be examined.

As mentioned earlier, the rationale for conducting the survey was to understand to what extent fiscal policy operators in localities believe fiscal variables affect growth or not. The survey focused on own source fiscal variables but there was also one question related to the impact of federal fiscal policy on growth. The description of the questionnaire is detailed in Table A.X

## 5.3.2 Results

As explained in chapter two, the central government plays a fundamental role in the redistribution of income, but local governments are the closest providers of public services and must guarantee the effective implementation of public policies (Oates, 1999).

**Table 5.1 Fiscal policy planners' opinion of fiscal variables effect on GDP growth**

| Question | Very significant | Significant | Slightly significant | Not significant |
|---|---|---|---|---|
| Effect of Direct Taxes on GDP growth | 19% | 65% | 14% | 2% |
| Effect of Indirect Taxes on GDP growth | 26% | 51% | 19% | 5% |
| Effect of Local Income on GDP growth | 21% | 40% | 40% | 0% |
| Effect of Federal Income on GDP growth | 49% | 44% | 7% | 0% |
| Effect of Current Expenditure on GDP growth | 21% | 40% | 35% | 5% |
| Effect of Capital Expenditure on GDP growth | 28% | 47% | 23% | 2% |
| Effect of Federal Fiscal Policy on GDP growth | 56% | 40% | 2% | 2% |
| Use of Local Taxing Power | 33% | 37% | 30% | 0% |
| | **Advisor** | **Director** | **Under secretary** | **Secretary** |
| Rank or position | 70% | 21% | 5% | 5% |
| | **Up to 3 years** | **4 to 6 years** | **7 to 10 years** | **More than 11 years** |
| Years of Experience | 23% | 23% | 19% | 35% |

Source: Own elaboration with self-developed survey in 32 Mexican states (2014)

Policy makers in my sample, acknowledge the fact that Federal Fiscal Policy is relevant in locality growth (40-56 %) and that there is scope for improving the local taxing power (33-37%). The significance of the effect of taxes on GDP growth is (19-65%) in the case of direct taxation and (26-51%) for indirect taxation. The relevance of local income is (21-40%). The higher the percentage of own source income, the higher possibility of managing resources. The lower

the percentage of own resources, the higher dependence on federal transfers and the less possibility of local action.

In the case of current and capital expenditure and its effect on growth the results were (28-47%) and (40-56%). In several interviews held during the development of the survey, fiscal planners said that the effect of cutting expenditures or implementing new taxes had an immediate impact on local productive activities, therefore on growth. For instance, when there were periods of layoffs or adjustments of expenditures, several local businesses closed and economic activity in the locality decreased. Simple taxes that were easy to administrate where the most efficient in increasing revenue of the local government. Summarizing, the government officials that answered the survey considered that fiscal policy had a significant effect on growth and only (2-5%) thought it was not significant.

Among the sample of government officials that participated in my questionnaire, 70% were advisors while only 10% were in the category of Minister and Undersecretary. Considering the years of experience in public finances, 23% had up to three years of experience and 54% had practiced more than seven years in the field. Public finance is a specialised field where the professionals that work in the local government at an advisory level are more likely to stay working in the local governments and develop their expertise, while the top-level government officials change every six years in states and every three years in municipalities.

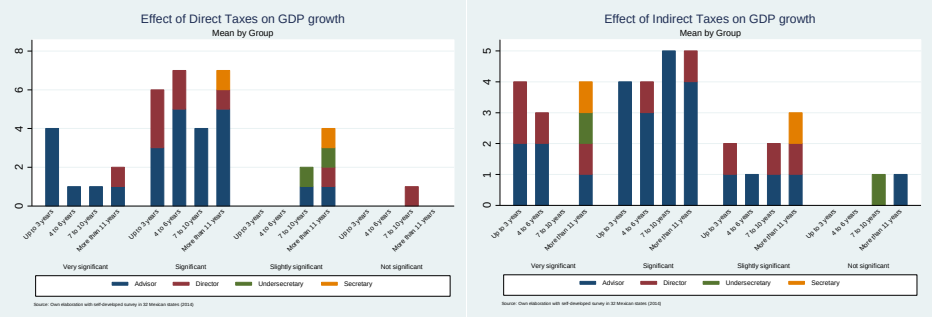
There is a high level of rotation in the local governments. The Governor for instance, might select its Ministers considering loyalty, partisan interests and ideology. Sometimes even if the technical staff belongs to the same party, upper and middle management levels change significantly with a new government, particularly at a municipal level. Furthermore, when the ruling party switches, even the lower management levels change drastically. At a federal level, the

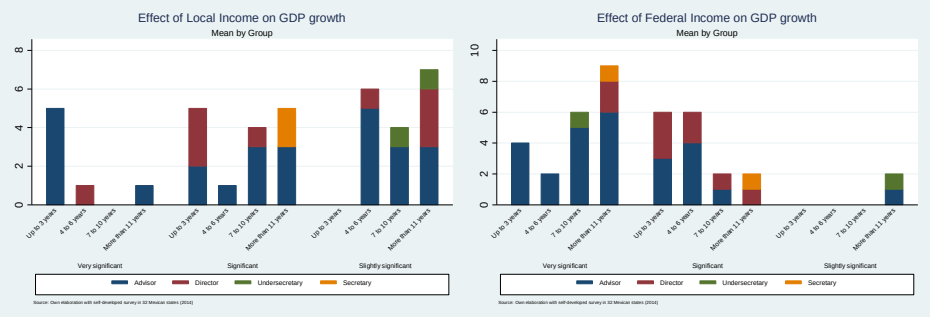
professional career service has been working since 2003, but it would be desirable to implement a similar system at a local level in order to guarantee the technical capacity required to develop public services efficiently (Alcaldes de México, 2013, p.1).

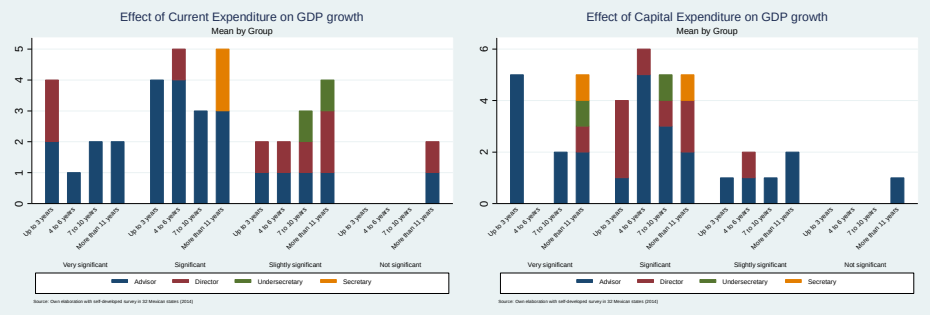
Considering that the municipality is the closest provider of public services, it would be necessary that the use of its resources to projects, programs and investment is clear and transparent, hence local public officials should be accountable for the use of funds. As mentioned in the previous section, new regulation in the area of accountability, transparency and anti-corruption have been enacted during 2016, which will certainly help in the process of fighting opacity in the use of public money and encourage trust among the local community. As an extension to my study, it would be helpful to promote a survey for municipal government officials, as a supplement to financial and budget reports, because this type of instruments, organised in a systematic way can allow people of the general public to better understand local public finances and enables public action to bridge the gap with the society.

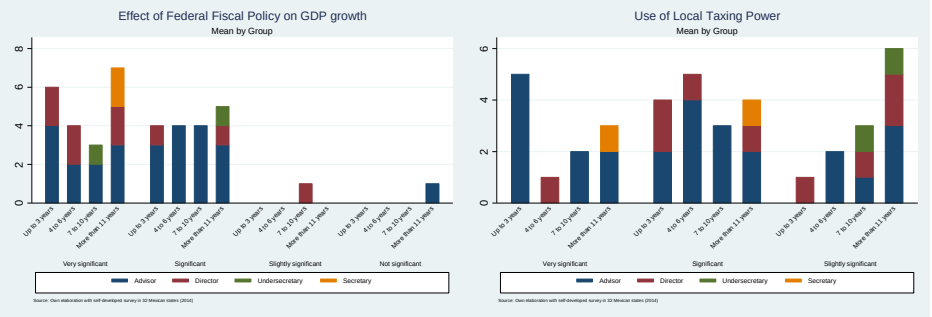
Finally, according to the feedback obtained during the development of my survey, it would be advisable that local government officials take advantage of the prevalent technological instruments, available training programs, broaden the cooperation and coordination within the different areas of the Ministry of Finance and with other Ministries, develop strategic alliances with universities, research and statistics institutes and keep up to date their organisational and functional structures in order to properly delineate functions and responsibilities.

## Graph 5.1 Fiscal policy planners' opinion of fiscal variables effect on GDP growth



### 5.3.3 Taxpayers view

As discussed in chapter two, Mexican institutions have developed in a context where there is a lack of transparency and accountability. Institutions are very diverse among different states and localities in Mexico. This situation can produce diverse outcomes depending on the degree of transparency and accountability of these sub-national organisations. As Persson and Tabellini (2000) stress, the structure of the institutions is relevant for policy making.

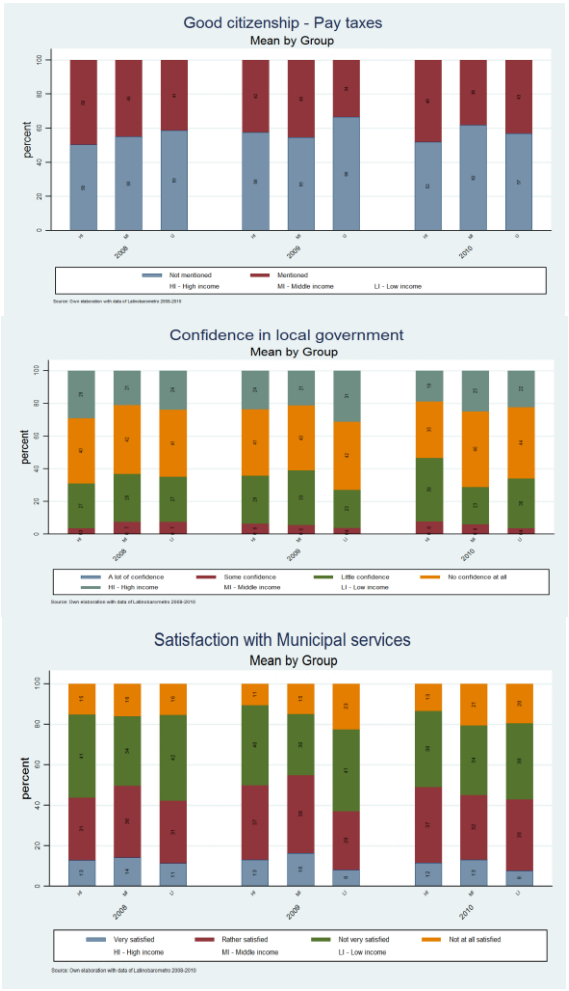
Additionally, Bird (2002) points out that the efficient provision of local services is possible when there is a clear mandate, suitable resources and accountability. Thus, the need for transparency in expenditure makes accountability for any resources canalised to local public authorities' essential. Taxpayers are more likely to contribute and the level of tax compliance can be higher when people understand how and where public money is spent.

Ugalde (2015) in his analysis of the Mexican democracy considers that although important steps have been developed in order to have better legislation in matters of transparency and anti-corruption programmes, the most relevant action is to guarantee the application of the law without exception. During the last 15 years, Transparency International in its Corruption Perceptions Index ranked Mexico with failing grades among 3.3 and 3.7 and in 2014 the country was in place 103 among 175 countries (Transparency International, 2014). These results indicate that bribes and corruption, unfortunately, have become part of several administrative procedures in governmental activities and confidence on local governments is hampered.

Analysing people´s satisfaction with the services provided in Mexican States during the period 2008-2010, considering Latinobarómetro surveys I find that around 50% of the people in the 162 localities included in the survey do not think paying taxes makes them good citizens. Moreover, about 70% of the people

interviewed do not trust or have little confidence on the local government. For half of the people considered in the surveys, the satisfaction with municipal service provision is marginal or people are not satisfied with overall services.

**Graph 5.2 People´s satisfaction with Local Services, Trust and Taxes**




To understand the linkage between fiscal variables and the level of satisfaction of local services, trust and taxes, I use an ordered probit regression where the dependent variable is a categorical variable which reflects the response for each question regarding the importance of paying taxes, confidence and satisfaction from 1 to 4 from 2008 until 2010 in 162 Mexican localities, which I classified as high, middle or low income as in chapter two. The independent variables in my model are the income and expenditure variables considered in my baseline specification when analysing states. In my understanding, there has not been a

similar exercise in establishing a relationship between taxpayer's satisfaction and fiscal policy figures. Research has focused on analysing surveys on the one hand, or statistic figures on the other hand but when they mix, the categorical variables are most commonly found in the right-hand side related to one statistical variable in the left-hand side.

Olken (2010, p.243) presents an experiment in 49 Indonesian villages regarding development projects through direct election plebiscites or representative meetings. Direct election is related to more knowledge about the project, increased satisfaction, higher benefits and willingness to contribute. Consequently, direct participation in political decision making can noticeably increment satisfaction and legitimacy. Iyer et al. (2005, p.1015) study 24,000 individuals in the USA grouped in nine regions and the relationship between social capital, economic growth and regional development. They find that education is significant for nearly all indicators of social capital and emphasise the importance of region-specific analysis. Lederman et. al (2005, p.1) study the determinants of corruption utilising several Gallup, Global Competitiveness, Country Risk, Standard & Poor's and World Bank indicators, considering political institutions that increase accountability. Their results confirm the importance of institutions in determining the incidence of corruption. Democracy, parliamentarian system, stability, and freedom of press are related with lower corruption. Kanbur et al. (2009, p.303) find that the possibility of promotion of provincial leaders in China increases with their economic performance, while their prospect of termination declines with their economic achievement.

## Table 5.2 People's satisfaction with Local services, Trust and Taxes.

| Questions | Good citizenship - Pay taxes | | | Confidence in local government | | | Satisfaction with Municipal services | | |
|---|---|---|---|---|---|---|---|---|---|
| VARIABLES | High income | Middle income | Low income | High income | Middle income | Low income | High income | Middle income | Low income |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **Fiscal policy variables** | | | | | | | | | |
| **Revenue** | | | | | | | | | |
| Direct tax | -4.47 | 6.10** | -0.97 | 1.36 | 1.91*** | 1.26 | 3.22 | 2.15* | 4.11 |
| | (7.06) | (2.59) | (7.80) | (1.48) | (0.66) | (1.70) | (2.87) | (1.24) | (2.73) |
| Indirect tax | -86.29** | -0.88 | 11.81 | -25.32*** | -2.15* | -3.54 | -20.39 | -4.97** | -0.54 |
| | (38.76) | (4.43) | (11.48) | (8.24) | (1.12) | (2.51) | (15.11) | (2.13) | (4.02) |
| Non-earmarked transfers | 0.03 | 0.62 | 0.03 | -0.42 | -0.06 | -0.18 | -0.99 | -0.3 | -0.57* |
| | (1.79) | (0.60) | (0.88) | (0.38) | (0.15) | (0.19) | (0.74) | (0.29) | (0.31) |
| Earmarked transfers | 0.35 | 0.99*** | -0.22 | 0.05 | 0.03 | 0.21* | -0.04 | -0.03 | 0.2 |
| | (0.81) | (0.34) | (0.54) | (0.17) | (0.09) | (0.12) | (0.33) | (0.16) | (0.19) |
| **Expenditure** | | | | | | | | | |
| Subsidies, transfers and aid | -0.95 | -1.44*** | -0.41 | 0.09 | -0.43*** | 0.12 | 0.98** | -0.39* | -0.09 |
| | (1.07) | (0.49) | (0.77) | (0.20) | (0.13) | (0.17) | (0.39) | (0.23) | (0.27) |
| Personal services | -2.51* | -1.74** | -0.4 | -0.06 | -0.62*** | 0.12 | 0.78 | -0.62* | -0.04 |
| | (1.29) | (0.73) | (0.85) | (0.27) | (0.19) | (0.18) | (0.52) | (0.35) | (0.29) |
| Capital expenditure | -4.09*** | -1.21* | -0.96 | -0.34 | -0.33** | 0.05 | 1.01* | -0.32 | 0.05 |
| | (1.51) | (0.65) | (0.86) | (0.29) | (0.16) | (0.18) | (0.55) | (0.31) | (0.30) |
| **Control variables** | | | | | | | | | |
| Average years of education | -3.58*** | 0.02 | 0.03 | -0.75*** | -0.01 | 0.02 | -0.76 | 0.01 | -0.01 |
| | (1.30) | (0.06) | (0.07) | (0.28) | (0.01) | (0.02) | (0.51) | (0.03) | (0.02) |
| Population growth | -1.55*** | 0.03 | 0.07 | -0.24*** | -0.04*** | 0.02 | -0.26 | -0.04 | 0.03 |
| | (0.46) | (0.05) | (0.08) | (0.09) | (0.01) | (0.02) | (0.17) | (0.02) | (0.03) |
| Life expectancy | 2.15*** | -0.04 | -0.01 | 0.44*** | 0.02 | -0.00 | 0.42 | 0.00 | -0.03 |
| | (0.75) | (0.07) | (0.06) | (0.15) | (0.02) | (0.01) | (0.28) | (0.03) | (0.02) |
| Observations | 806 | 1,553 | 1,078 | 806 | 1,553 | 1,078 | 806 | 1,553 | 1,078 |
| Pseudo R2 | 0.0363 | 0.0143 | 0.0143 | 0.0336 | 0.0154 | 0.0109 | 0.0143 | 0.0098 | 0.0099 |
| Log likelihood | -536.67*** | -1044.97*** | -712.18*** | -965.71*** | -1880.43*** | -1295.98*** | -1001.11*** | -2024.3*** | -1350.29*** |

Notes: Dependent variable is a categorical variable which reflects the responses for each question regarding importance of paying taxes, confidence and satisfacion from 1 to 4. Independent variables have one period lagged values. Annual data for 1998-2010. All regressions also contain year dummies and a constant term. SE are reported in parentheses. Regressions are estimated by ordered probit. ***(**/*) denotes statiscally significant at the 1%(5%/10%) level.

The Table 5.2 reflects the influence of fiscal variables on the categorical variable which reflects the response for each question regarding the importance of paying taxes, confidence and satisfaction. In the case of the question referring to good citizenship and taxes, where the localities identified weather they thought paying taxes made them good citizens or not, the effects are mixed among the income groups. In the low-income group, the fiscal variables did not show any effect on the perception of paying taxes as to being a good citizen. In the case of the middle-income group, higher level of direct taxes and non-earmarked transfers are linked with the will of paying taxes because of considering such payment as a part of being a good citizen; however, higher levels of spending are related with lower compliance. Moreover, in the high-income group, the relationship is negative with fiscal variables, which implies that when the level of resources received or spent is high, people is unlikely willingly to pay taxes as part of being a good citizen. These results could be explained because of the opacity in local public resources, corruption, the diversion of public funds, and the perception of people that some government officials abuse of their functions and look for their own self-interest instead of the community benefit, as explained earlier in this chapter.

In relation to the question that ranks the confidence in local government from no local confidence to a lot of confidence, the low-income group results show only a slight positive effect of earmarked transfers, perhaps because they know that since those resources have to be spent according to the federation mandate, the state is unable to spend those resources carelessly. The middle-income group presents a negative relationship between indirect taxes, the levels of spending and confidence in the local government and only a slight positive effect in the case of direct taxes. In the high-income group, the development of the fiscal variables does not show any incidence on the confidence in local governments, however, I find a negative impact of indirect taxes on confidence in local governments. This situation could be result of the high tax evasion that exists in this type of resources, as explained earlier in this work (chapters one and two). In my understanding and considering the analysis developed in this work, higher accountability of public resources, better institutions and service from

government officials, could increase confidence in the local governments in Mexico.

Considering the question that positions satisfaction with municipal services from not at all satisfied to very satisfied, no relationship is found between the fiscal variables and municipal service satisfaction in low-income states, with the exception of a slightly negative effect of non-earmarked transfers on municipal satisfaction. As mentioned in chapter two, this type of resource refers to a free outlay transfer that the local government can spend without restriction, therefore, if people perceive that this resource is not properly monitored and spent, there is no trust that the local authority will spend it on the benefit of the population. Furthermore, a slightly positive effect can be seen in middle-income states in the case of direct taxes, but a negative effect is detected in the case of indirect taxes, current and capital expenditure. My findings can be explained by the fact that government corruption is linked with public construction contracts and concessions (Ugalde, 2015). Additionally, there is no link of any kind between income variables and satisfaction of public services in high-income localities, however, in this group higher subsidies and capital expenditures are related to higher levels of taxpayers' satisfaction. Perhaps the explanation to this last result is that even though people do not trust their local authorities and are not willing to pay taxes because of the perceived corruption, richer states have a higher capacity to deliver proper services to their population.

Government employees must focus on providing a good service to the taxpayers while policies implemented have to be attentive to the conditions under which they take place. Strategic planning in governmental management needs to have a clear vision of service and people should be able to understand where their taxes have been spent.

According to Article 31 fracc. IV of the Political Constitution of the United Mexican States "Mexicans are obliged to pay taxes for public expenditure, in the

federation, states, Mexico City and municipalities according to their place of residence, in a proportional and equitable manner provided by law". In this sense, it is essential to raise the awareness among the population to pay taxes. However, if public finances are sound, transparent and government officials are accountable for taxpayers' money, most likely people would be willing to pay taxes, otherwise they won't pay them regardless of the law. The transparency, certainty, equity and justice in the governmental rules and procedures allows citizens to clarify their participation in the process of paying taxes and public service delivery.

**Graph 5.3 Administrative and institutional framework in Mexican localities**

As stated by De la Torre (2012), regional disparities among regions are immense. González (2003) ponders that the responsibilities of different levels of government should be revisited to harmonise public administration in the three levels of government. Accountability and transparency should be addressed to have sound local public finances. In his study, he finds a contrast between urban and rural municipalities whose spending patterns follow distinct trends. Urban municipalities expenditure follows a spending trend more related to their own source income, while rural municipalities expenditure relies heavily on central government transfers.

As described in Graph 5.3, high income localities can handle a higher amount of procedures to provide public services to local inhabitants, while low income states, in contrast, do not have the capacity to provide enough local services. Anti-corruption programs can be instrumented by high income states but low-income localities can hardly manage anti-corruption activities. Participation bodies are more active in high income states and regulatory provisions are stronger as well in high income localities compared to low income states. Not surprisingly, government officials are also more qualified in high income localities.

As mentioned in chapter three, only 309 municipalities in Mexico out of 2,247 generate 74 percent of national GDP and concentrate 53 percent of the population. Overall, localities in Mexico show an important difference in administrative capacity, anti-corruption programs, citizen participation and regulatory framework.

## *5.4 Conclusion*

The effectiveness of a particular fiscal policy would depend upon its feasibility and implementation. The scarcity of resources is a reality in poor localities, therefore a better allocation of the available resources is fundamental. Local tax offices should become units of service, quality and transparency in the eyes of taxpayers.

People should be able to trust their local authorities; the integrity and impartiality of the government officials could become a guarantee for the citizens that the law is being enforced correctly. The fact that local authorities in the states change every six years and in municipalities every three years without a proper development plan for long term projects, gives inhabitants uncertainty about the continuity of local policies.

Government officials must carry out their tasks and responsibilities with an attitude of service and ethics; and their training programs must promote continuous updating. With the objective of giving certainty to taxpayers, public finances must be reliable and transparent.

This current work gives us a wider picture of the policy making process. The linkage with policy making perception regarding fiscal policy variables and the opinion that people have regarding tax levied and spending efficiency. This work intends to become a bridge between growth macroeconomic models and fiscal policy practice.

Consequently, as a result of the analysis of diverse fiscal policies, which in turn reflect different income and expenditure patterns, this study will contribute to the discussion of achieving higher levels of growth by fiscal policy management. Nonetheless, the impact of fiscal policy variables is diverse among the different levels of government, which implies that particular attention should be addressed

to account for these differences when formulating fiscal policy. The results of the study suggest that fiscal policy must properly recognise capabilities, allocation of resources, strategies, needs and disparities among localities. Strategic management, Innovation techniques, accountability, transparency, a better institutional framework, and a more accurate legislation is fundamental during this process.

# 6. Concluding Remarks, Recommendations and Future Research.

## 6.1 Introduction

Effective local fiscal policy needs to take into account particular characteristics of a region and its level of development. This study finds that a complete specification -detailed description- of the government budget constraint is necessary to identify the budget effects which take place at different levels of government. Each locality has its own particular combination of resources, capabilities and needs. This work estimates the impact of fiscal policy through a number of income and expenditure variables on output per capita growth and employment/unemployment using fixed- effects panel data econometric methodology in 32 states and 2,247 municipalities of Mexico from 1994 to 2010, and country data in 20 Latin American economies during the same period. Besides, this analysis computes the impact on growth of the 1998 Federal Reform to the Fiscal Coordination System in Mexico, since it is the most significant reform in the decade regarding transfers from central to local governments. The main result in this research is that local fiscal policy is inaccurate if it does not take into account income and expenditure components in the budget constraint when analysing the effect of fiscal policy variables on Gross Domestic Product per capita (GDP per capita) and employment/unemployment at a sub-national level. This study will suggest that localised and targeted fiscal policy works when taking into account the particular characteristics of a locality. Additionally, this research discusses the linkage between policy makers' perception, public finances and the local inhabitants' opinion regarding public services provided -considering a self-developed survey in the 32 Mexican states and Latinobarómetro surveys from 2008 to 2010. The aim of this study might contribute to the discussion of a pragmatic application of fiscal policy management. The impact of fiscal policy variables is not equal among the different levels of government, which suggests that 1) policy makers need to account for local population needs and disparities to overcome regional

inequalities; 2) a lack of local government capacity building and 3) relevance of institutional framework.

## 6.2 Major findings and Implications

### *Fiscal policy mix*

Between the different levels of government, the links and impact of fiscal policy variables are diverse. National policy is implemented under a general framework and state governments serve as a bond between federal government and local authorities. According to Tiebout (1956) local governments are the closest to voters' preferences and serve as the ultimate providers of goods and services for their inhabitants. This current research serves as a bridge between growth macroeconomic models and local fiscal policy in practice. As explained in chapter two, previous empirical growth studies focus either on the evolution of income or expenditure variables exclusively and only a few like Gemmell (2012) and Kneller (1999) use a full disaggregation of fiscal components, however, they have alternated between either tax or expenditure components and have not considered them simultaneously. As discussed in chapter two as well, it is vital to acknowledge the different legislative, institutional, political, administrative and social frameworks, which in turn, lead to the differentiated impact of fiscal policy variables on growth according to the level of government analysed.

The level of fiscal centralisation in Mexico is high, situation that generates problems of continuity in the governance at the three levels of government. Additionally, around seventy percent of employment depends upon small and medium enterprises. Around forty two percent of the Mexican population lives in a certain level of poverty, which limits human capital investment. As described in the municipality and state analysis, the disparity among regions is huge not only between localities but also between urban and rural settings. For instance, in 2013, productivity in Campeche, was twelve times higher than in Chiapas. The difference in local productivity and education attainment

contributes to regional disparities as well. Low income regions are not integrated to the global economy and their growth is modest compared to the average of the national economy. Conversely, the northern and central regions have a higher level of specialisation, investment, technology and innovation. In the Mexican economy, forty one percent of GDP is concentrated in only ten percent of its regions, while the resultant ninety percent are behind average development (OECD, 2016). There are no cross sectoral policy programmes, and although approaches like "Micro-Regions" and "Prospera" are important to alleviate regional disparities, local and regional development should be enhanced through a three level of government strategy in an integrated way, alienated with the National Development Plan.

The innovative contribution of this study is to analyse the combined effects of different kinds of disaggregated expenditure and taxes on output per capita and employment/unemployment at a sub-national level and acknowledging their differences. In order to test my hypothesis, I run panel fixed effects regressions considering income or expenditure components separately and then jointly and My findings provide evidence that there is a difference between the coefficients in all three regressions with slightly more significant coefficients in my broader model.

Additionally, I find mixed effects of taxes in local governments in Mexico and the relative importance of public investment for less developed localities, which means that developing the adequate infrastructure can have a strong and positive impact for their economic improvement. These results are consistent with Devarajan et al. (1996) that find that current expenditure can boost growth in less developed economies, and the relationship between government capital expenditure and growth is negative in developing countries due to misallocations of public spending. The effect of the fiscal variables is mixed among the different levels of government in Mexico and in the case of Latin American countries, the effects might be offsetting because I am pooling countries which have different levels of development, but unfortunately, due to lack of data, I was

unable to run separate regressions by income group. Transfers have a positive effect in less developed municipalities while the effect becomes negative in more developed localities. In the case of Mexico this would imply transfers from the rich to the poor.

Regarding the effects of fiscal policy on employment, the literature is scarce; fiscal policy variables have rarely been considered to influence levels of employment. Labour and growth have been seen as exclusively a central government concern, however, in practice, local authorities implement actions that affect production and employment in the local economy. The effect of taxes in local employment in Mexico is mixed and in Latin American economies higher taxes reflect in higher levels of unemployment. Capital expenditure effect on the labour market is mixed in both cases, which can lead to further detailed analysis in understanding how do local markets operate.

Overall, local governments have the mandate to enact the potential tax sources, and as discussed along this work, in order to have the possibility to optimise the management of their resources. Depending on the income and substitution effects in the supply of labour force (positive or negative slope), the distinct municipalities have the possibility of raising or decreasing taxes and affect households' disposable income, which is an important component that directly affects consumption, investment and savings in the local economy. For instance, when the local government increases local government consumption, the demand for goods and services expands as well in the local economy. Since the aggregate demand goes up, local production increases and there is a positive effect on local employment. Conversely, the opposite happens in the case the local government decides to diminish government consumption.

In the case of Mexico, government spending is complimentary with private spending (Amieva Huerta, 2010), although, according to my group state analysis, current expenditure is positively related with local growth since capital

expenditure can be a means for fraud in the procurement process of public works. Moreover, as mentioned earlier, transfers play an important and positive role in local governments, nevertheless, local authorities can have an active role in promoting local employment, particularly in small localities, where the government is the provider of local jobs by spending money on building new roads, parks, or even hiring bureaucrats.

Therefore, as explained in my work, this study intends to be a bridge between theory and practice, since I recognize that prevalent growth models can be useful to understand the partial effects of income and expenditure variables, it would be desirable in the future to construct new theoretical models that adapt theory to day to day public finances. The choice to raise revenue and channel expenditure takes place in the same fiscal year and more realistic theoretical approaches would be very useful for fiscal policy decision making. Additionally, to explore new possibilities of linking local fiscal policy to employment and unemployment indicators remain a question for future research.

## *Mexican Federal Reform of 1998*

For the case of Mexico in particular, the impact on output per capita of the 1998 Federal Reform to the Fiscal Coordination System is analysed. The data available for 17 years is limited, therefore, a dummy variable is included in states and municipalities in 1998 to account for this reform. It is a very simple method but it is a reform that cannot be left aside due to its importance for the federalism system in Mexico. The results of the current study show that this reform has a positive effect, particularly on low income localities, while some negative effects in more developed municipalities. According to Coneval (2011) no systematic evaluation and analysis of Branch 33 (earmarked transfers) exists, information is heterogeneous and clear and specific objectives should be designed. Many localities don't have the financial capacity to undertake these type of tasks, however, simple controls should be implemented to be able to track the use of these resources. The implementation of suitable indicators that allow the adequate evaluation of Branch 33 funds should be considered. The

aforementioned study recognizes that the resources canalised through Brach 33 do not reflect adequately the requirements of particular localities. Abud and Rodriguez (2012) find that GDP per capita at a state level is negatively correlated with the efficiency of earmarked transfers. Ramírez (2013) states the importance of controls in the three level of governments in order to adequately coordinate efforts to canalize Branch 33 resources efficiently. Therefore, the resources of Branch 33 should not follow inertial patterns from historic trends but Human Development Index, locality needs and measurable achievements in local tax collection.

## *A social perspective*

The linkage between policy makers' perception regarding fiscal variables, public finances and the local inhabitants' opinion in relation to public services provided is crucial to understanding the way resources are utilised according to the priorities of the local authorities and the perceived benefit of governmental services among people within a certain locality. This in turn gives a broader picture of the use of public funds by involving both actors: local authorities and the people affected by the local policies.

As I state along the development of my thesis, local governments must guarantee the effective implementation of public policies (Oates, 1999), and according to the results of my self-developed survey in Mexico during 2014-2015, government officials considered that fiscal policy had a significant effect on growth (up to 65%) and only (2-5%) thought it was not significant. With respect to the analysis of Latinobarómetro surveys 2008-2010 for localities in Mexico, I utilise an ordered probit regression where the dependent variable reflects the response to questions regarding taxes, confidence and satisfaction of local services and the independent variables in my model are the fiscal variables. In my understanding, there has not been a similar exercise in establishing a relationship between taxpayer's satisfaction and fiscal policy variables. My results show a lack of confidence in the local government and poor taxpayer satisfaction with municipal services.

To a large degree, the effectiveness of a particular fiscal policy depends upon its feasibility and implementation. The scarcity of resources is a reality in poor localities, therefore a better allocation of the available resources is fundamental. Local tax offices should become units of service, quality and transparency in the eyes of taxpayers. People should be able to trust their local authorities; the integrity and impartiality of the government officials could become a guarantee for the citizens that the law is being enforced correctly.

Government officials must carry out their tasks and responsibilities with an attitude of service and ethics; and their training programs must promote continuous updating. With the objective of giving certainty to taxpayers, public finances must be reliable and transparent.

## 6.3 Recommendations, limitations and future research

According to Oates (1999) local governments actively seek satisfactory provision of public goods to inhabitants because they are close to them. However, in my opinion, his statement would only be true given an adequate institutional framework, where people have confidence in local governments and are satisfied with municipal services. From this perspective, empowering and incentivising local governments and actors to actively enhance growth and development within a locality can be an area of opportunity and challenge for new government policy (Bowley, 2010). For example, in Mexico City during 2001, the Major promoted a social program for elderly, which was later copied by other local governments and even adopted at a national level in 2007. Local governments could initiate changes to the tax system, improve tax administration and compliance, have better budget practices, increase transparency and accountability of resources, eliminate discretionary provisions and opaque public auctions. Additionally, measures to promote investment, employment and actions to support innovation and increase productivity can enhance economic development. Looney and

Frederiksen (1981) findings suggest that public investment is the initiating element in local development.

It would be desirable that fiscal policy played a more active role at a local level and each municipality and state could acknowledge their unique characteristics, relative advantages and core competencies in order to enhance synergies within the same local government, different private and public actors and among regions to overcome disparities and promote growth and development within Mexico as a whole. Municipal and local capacity should be enhanced in order to form specialised public government officials that can serve efficiently in the provision of public services and have continuity in the development of local programs that go beyond the election cycle. As mentioned along the development of my work, transparency in the use of public funds is fundamental in order to build trust between the three levels of government and the local community. Furthermore, universities, research centres, other organised civil associations and civil society should participate more actively in local, regional and national development.

The institutional framework, the inequality and the high level of heterogeneity between states and municipalities has to be considered in order to properly understand intergovernmental relationships in Mexico. Moreover, when evaluating trends of income and government expenditure components and their impact on growth and employment, no straight-forward approach can be used in order to maximise local revenue, guarantee local service provision and overcome regional inequalities. Although Mexico has a large centralized federation history, equilibrium responsibilities between the three levels of government have to be tackled to attain sound public finances, efficiency, transparency, accountability, adequate reporting, supervision and compliance with an adequate legal framework.

Mexico is one of the eight founding governments of the Open Government Partnership that promotes transparency, accountability, citizen involvement,

technology and innovation, however, there are huge challenges to overcome, particularly at a local level, in the context of lack of confidence of the community in their representatives, political leaders and the use and application of public funds.

Consequently, as a result of the analysis of diverse fiscal policies, which in turn reflect different income and expenditure patterns, this study contributes to the discussion of achieving higher levels of growth and employment by fiscal policy management. Nonetheless, the impact of fiscal policy variables is diverse among the different levels of government, which implies that particular attention should be addressed to account for these differences when formulating fiscal policy. The results of this thesis suggest that fiscal policy must properly recognise capabilities, allocation of resources, strategies, needs and disparities among localities. Strategic management, innovation techniques, accountability, transparency, a better institutional framework, and a more accurate legislation is fundamental during this process.

This study has several limitations regarding the interpretations of results, since the variables utilised in Mexico do not cover the informal economy, indicators of corruption and transparency, externalities and the fiscal variables utilised are likely to be endogenous; therefore, although the lag of the fiscal variables is one year, I am only able to provide conditional correlations among my fiscal variables, growth and employment. Additionally, the results of the Mexican surveys are only true for the sample considered and cannot be generalised beyond the sample.

# 7. Appendix A. States, Additional Tables

## Table 7.1 Income – Expenditure Growth Regression across Mexican States 1994-2010

| | Baseline specification | Income | Expenditure |
|---|---|---|---|
| **VARIABLES** | (1) | (2) | (3) |
| **Fiscal policy variables** | | | |
| **Revenue** | | | |
| Direct tax | -23.35<br>(19.00) | -22.55<br>(14.12) | |
| Indirect tax | 49.43<br>(67.80) | 24.86<br>(66.95) | |
| Non-earmarked transfers | -2.17<br>(1.89) | -0.79<br>(1.30) | |
| Earmarked transfers | -3.30<br>(2.89) | -1.47<br>(1.22) | |
| **Expenditure** | | | |
| Subsidies, transfers and aid | 3.90<br>(3.33) | | 2.10<br>(2.10) |
| Personal services | 0.99<br>(5.24) | | -0.88<br>(3.88) |
| Capital expenditure | -3.88<br>(5.35) | | -5.07<br>(3.56) |
| **Control variables** | | | |
| Fiscal reform | -1.28***<br>(0.27) | | -1.32***<br>(0.28) |
| Recession dummy | -6.32**<br>(2.73) | | -6.16**<br>(2.78) |
| Real GDP per capita | -2.02***<br>(0.45) | -2.08***<br>(0.44) | -2.06***<br>(0.44) |
| Average years of education | 4.30**<br>(1.58) | 3.39**<br>(1.24) | 4.25**<br>(1.67) |
| Population growth | -1.43<br>(1.15) | -1.55<br>(0.95) | -1.48*<br>(0.74) |
| Life expectancy | 0.24<br>(0.47) | 0.43<br>(0.49) | 0.13<br>(0.41) |
| Campeche - 2003 | 367.11***<br>(1.23) | 367.03***<br>(1.25) | 367.06***<br>(1.23) |
| Tabasco - 2003 | 104.90***<br>(1.16) | 104.75***<br>(1.02) | 105.01***<br>(1.23) |
| Observations | 510 | 510 | 510 |
| Number of states | 32 | 32 | 32 |
| F - statistic | 46853*** | 20856*** | 41335*** |
| R - squared | 0.624 | 0.619 | 0.622 |

Notes: Dependent variable is real GDP per capita annual percentage growth rate. Independent variables have one period lagged values. Annual data for 1994-2010. All regressions also contain year dummies and a constant term. SE are reported in parentheses. The estimators used are fixed effects, system and the Discroll and Kraay (1998) that accounts for autocorrelation, heteroskedasticity and cross sectional dependence. Fisher Unit Root Test was conducted to all regression variables and accepting in most of them the alternative hypothesis of at least one Panel being stationary at a 10% level. ***(**/*) denotes statistically significant at the 1%(5%/10%) level.

## Table 7.2 Income - Expenditure Growth Regression with State Group Interactions by Income Level for Mexico from 1994-2010

| | Baseline specification | Income | Expenditure |
|---|---|---|---|
| **VARIABLES** | (1) | (2) | (3) |
| **Fiscal policy variables** | | | |
| Indirect tax, High income | 122.54<br>(97.51) | 48.40<br>(84.10) | |
| Indirect tax, Middle income | -16.19<br>(82.52) | -59.49<br>(71.12) | |
| Indirect tax, Low income | 125.32<br>(115.78) | 64.24<br>(88.50) | |
| Subsidies, transfers and aid, High inc | -5.78<br>(5.09) | | -4.67<br>(4.52) |
| Subsidies, transfers and aid, Middle | 4.02**<br>(1.55) | | 4.19**<br>(1.53) |
| Subsidies, transfers and aid, Low inc | 6.29***<br>(0.94) | | 6.12***<br>(0.86) |
| Personal services, High income | -10.99*<br>(5.66) | | -9.57*<br>(4.95) |
| Personal services, Middle income | 4.78*<br>(2.51) | | 4.74*<br>(2.65) |
| Personal services, Low income | 5.23<br>(3.59) | | 5.38<br>(3.54) |
| Capital expenditure, High income | -14.07**<br>(5.79) | | -11.22*<br>(5.61) |
| Capital expenditure, Middle income | -2.51<br>(5.51) | | -2.78<br>(5.51) |
| Capital expenditure, Low income | -1.18<br>(4.36) | | -0.48<br>(3.77) |
| **Control variables** | | | |
| Fiscal reform | 5.22**<br>(1.79) | | 4.92***<br>(1.62) |
| Recession dummy | 1.97***<br>(0.06) | | 1.98***<br>(0.06) |
| Real GDP per capita | -1.76***<br>(0.48) | -2.00***<br>(0.45) | -1.75***<br>(0.48) |
| Population growth | -2.42**<br>(0.90) | -2.32**<br>(0.89) | -2.08***<br>(0.56) |
| Campeche - 2003 | 368.31***<br>(1.39) | 367.18***<br>(1.30) | 368.36***<br>(1.41) |
| Tabasco - 2003 | 105.25***<br>(1.58) | 104.50***<br>(1.12) | 105.41***<br>(1.64) |
| Observations | 510 | 510 | 510 |
| Number of states | 510 | 510 | 510 |
| F - statistic | 1.856e+06*** | 36457*** | 98464*** |
| R - squared | 0.629 | 0.617 | 0.627 |

Notes: Dependent variable is real GDP per capita annual percentage growth rate. Independent variables have one period lagged values. Annual data for 1994-2010. All regressions also contain year dummies and a constant term. SE are reported in parentheses. The estimators used are fixed effects and the Discroll and Kraay (1998) that accounts for autocorrelation, heteroskedasticity and cross sectional dependence. Fisher Unit Root Test was conducted to all regression variables and accepting in most of them the alternative hypothesis of at least one Panel being stationary at a 10% level. ***(**/*) denotes statistically significant at the 1%(5%/10%) level.

## Table 7.3 Income - Expenditure Employment Regression across Mexican States from 1994-2010

| | Baseline specification | Income | Expenditure |
|---|---|---|---|
| **VARIABLES** | (1) | (2) | (3) |
| **Fiscal policy variables** | | | |
| **Revenue** | | | |
| Direct tax | -26.82*<br>(12.71) | -27.71**<br>(12.62) | |
| Indirect tax | -5.50<br>(14.80) | -9.21<br>(15.48) | |
| Non-earmarked transfers | 1.45<br>(1.08) | 1.36<br>(1.06) | |
| **Expenditure** | | | |
| Capital expenditure | -1.53<br>(1.00) | | -2.35*<br>(1.16) |
| **Control variables** | | | |
| Fiscal reform | 7.10<br>(7.67) | | 15.16**<br>(6.12) |
| Recession dummy | -0.69***<br>(0.19) | | -0.48**<br>(0.18) |
| Real GDP per capita | 0.85***<br>(0.20) | 0.85***<br>(0.19) | 0.81***<br>(0.20) |
| Average years of education | 1.44*<br>(0.76) | 1.42*<br>(0.74) | 0.60<br>(0.62) |
| Population growth | -0.98*<br>(0.53) | -0.92<br>(0.52) | -1.21***<br>(0.40) |
| Campeche - 2003 | 2.11***<br>(0.33) | 2.13***<br>(0.32) | 2.03***<br>(0.34) |
| Tabasco - 2003 | 0.45**<br>(0.16) | 0.48**<br>(0.17) | 0.43**<br>(0.18) |
| Observations | 448 | 448 | 448 |
| Number of states | 32 | 32 | 32 |
| F - statistic | 119370*** | 62013*** | 126620*** |
| R - squared | 0.996 | 0.996 | 0.996 |

Notes: Dependent variable formal employment rate per capita annual percentage growth rate. Independent variables have one period lagged values. Annual data for 1994-2010. All regressions also contain year dummies and a constant term. SE are reported in parentheses. The estimators used are fixed effects and the Discroll and Kraay (1998) that accounts for autocorrelation, heteroskedasticity and cross sectional dependence. Fisher Unit Root Test was conducted to all regression variables and accepting in most of them the alternative hypothesis of at least one Panel being stationary at a 10% level. ***(**/*) denotes statistically significant at the 1%(5%/10%) level.

## Table 7.4 Income - Expenditure Employment Regression with State Group Interactions by Income Level for Mexico from 1994-2010

| | Baseline specification | Income | Expenditure |
|---|---|---|---|
| **VARIABLES** | (1) | (2) | (3) |
| **Fiscal policy variables** | | | |
| Direct tax, High income | -23.99*<br>(12.01) | -30.63**<br>(10.81) | |
| Direct tax, Middle income | -23.99*<br>(12.24) | -23.21*<br>(12.90) | |
| Direct tax, Low income | 18.86<br>(20.57) | 16.56<br>(19.85) | |
| Indirect tax, High income | 4.61<br>(14.95) | -0.85<br>(15.67) | |
| Indirect tax, Middle income | -31.52<br>(60.86) | -28.56<br>(59.35) | |
| Indirect tax, Low income | 127.22***<br>(41.75) | 103.27**<br>(35.49) | |
| Non-earmarked transfers, High income | 1.70<br>(2.11) | 1.75<br>(2.05) | |
| Non-earmarked transfers, Middle income | -0.39<br>(0.79) | -0.50<br>(0.77) | |
| Non-earmarked transfers, Low income | 3.12***<br>(0.86) | 3.03***<br>(0.88) | |
| Capital expenditure, High income | -3.57***<br>(1.18) | | -5.19***<br>(1.26) |
| Capital expenditure, Middle income | 1.15<br>(1.61) | | -0.29<br>(1.88) |
| Capital expenditure, Low income | -4.45***<br>(1.31) | | -3.12***<br>(0.80) |
| **Control variables** | | | |
| Fiscal reform | 0.00<br>(0.00) | | 0.00<br>(0.00) |
| Recession dummy | 9.03<br>(7.62) | | 13.57**<br>(5.13) |
| Real GDP per capita | 0.89***<br>(0.24) | 0.91***<br>(0.23) | 0.83***<br>(0.23) |
| Average years of education | 1.01<br>(0.85) | 1.07<br>(0.76) | 0.48<br>(0.57) |
| Population growth | -1.41***<br>(0.44) | -1.28***<br>(0.41) | -1.28***<br>(0.39) |
| Campeche - 2003 | 2.11***<br>(0.36) | 2.19***<br>(0.34) | 2.01***<br>(0.39) |
| Tabasco - 2003 | 0.28<br>(0.23) | 0.38<br>(0.29) | 0.34**<br>(0.14) |
| Observations | 448 | 448 | 448 |
| Number of states | 32 | 32 | 32 |
| F - statistic | 2895*** | 1733*** | 18.81*** |
| R - squared | 0.371 | 0.366 | 0.339 |

Notes: Dependent variable formal employment rate per capita annual percentage growth rate. Independent variables have one period lagged values. Annual data for 1994-2010. All regressions also contain year dummies and a constant term. SE are reported in parentheses. The estimators used are fixed effects and the Discroll and Kraay (1998) that accounts for autocorrelation, heteroskedasticity and cross sectional dependence. Fisher Unit Root Test was conducted to all regression variables and accepting in most of them the alternative hypothesis of at least one Panel being stationary at a 10% level. ***(**/*) denotes statistically significant at the 1%(5%/10%) level.

# 8. Appendix B. Municipalities, Additional Tables

## Table 8.1 Income-Expenditure Growth Regression considering Cross Sectional Dependence for Municipalities in Mexico 1994-2010

| VARIABLES | Group 1 | | | Group 2 | | | Group 3 | | | Group 4 | | | Group 5 | | | Group 6 | | | Group 7 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Complete | Income | Expenditure | Complete | Income | Expenditure | Complete | Income | Expenditure | Complete | Income | Expenditure | Complete | Income | Expenditure | Complete | Income | Expenditure | Complete | Income | Expenditure |
| **Fiscal policy variables** | | | | | | | | | | | | | | | | | | | | | |
| **Revenue** | | | | | | | | | | | | | | | | | | | | | |
| Tax | 2.01 | 3.28** | | 5.47 | 5.84 | | 3.51** | 3.54** | | 5.35** | 5.70* | | 0.03 | 0.15 | | 0.73* | 0.75* | | 1.70* | 1.75* | |
| | (1.34) | (1.37) | | (4.78) | (4.86) | | (1.58) | (1.63) | | (2.24) | (2.74) | | (0.28) | (0.25) | | (0.39) | (0.42) | | (0.86) | (0.86) | |
| Non-earmarked transfers | 9.34*** | 12.37** | | 4.72*** | 6.21** | | 6.57** | 7.08** | | 8.22*** | 9.13*** | | 2.11 | 3.42 | | 9.00*** | 9.69*** | | 7.41*** | 7.03** | |
| | (3.01) | (4.37) | | (1.38) | (2.32) | | (2.93) | (3.19) | | (1.52) | (1.32) | | (2.75) | (2.81) | | (2.24) | (2.39) | | (1.66) | (2.41) | |
| **Expenditure** | | | | | | | | | | | | | | | | | | | | | |
| Aquisition of movable and immovable goods | -0.60 | | -0.95* | -0.40 | | -1.04 | -0.23 | | -0.89 | 5.68 | | 5.46 | -0.13 | | -0.20 | -0.43 | | -0.44* | -0.54 | | -0.64 |
| | (0.70) | | (0.53) | (0.56) | | (0.77) | (0.66) | | (0.72) | (4.60) | | (4.72) | (0.57) | | (0.51) | (0.25) | | (0.24) | (0.35) | | (0.40) |
| Public infrastructure | -4.40 | | -9.55** | -3.12* | | -7.42** | -0.77 | | -4.41 | -7.39*** | | -10.47*** | -2.00* | | -2.84 | -3.09 | | -4.44* | -1.74 | | -2.91 |
| | (2.60) | | (4.19) | (1.76) | | (3.28) | (2.15) | | (3.30) | (2.46) | | (2.88) | (1.08) | | (1.73) | (1.81) | | (2.28) | (1.96) | | (2.42) |
| Other expenditure | 5.63 | | 8.57** | -0.18 | | 1.87 | -1.85 | | -0.36 | -4.21 | | -2.54 | 4.36 | | 4.72 | 3.14 | | 3.93 | -4.24 | | -2.31 |
| | (3.73) | | (3.52) | (2.40) | | (2.72) | (3.46) | | (3.78) | (3.83) | | (3.58) | (4.12) | | (4.01) | (2.48) | | (2.32) | (9.11) | | (9.56) |
| **Control variables** | | | | | | | | | | | | | | | | | | | | | |
| Fiscal reform | 28.60*** | | 18.66*** | 11.61 | | -1.68 | 13.62*** | | 25.95 | 61.02*** | | 40.87** | -52.89 | | -42.18 | -79.36** | | -21.19 | -11.53 | | 5.24 |
| | (4.46) | | (1.61) | (6.88) | | (2.13) | (4.43) | | (37.79) | (8.49) | | (14.97) | (43.17) | | (37.32) | (27.87) | | (27.09) | (91.78) | | (3.09) |
| Recession dummy | 27.50 | | 2.80 | 26.75** | | 19.00 | 8.85 | | -5.96 | -18.61 | | -33.77** | 5.02 | | 2.26 | 16.23*** | | 4.92* | 6.89 | | -3.50 |
| | (20.26) | | (17.58) | (12.37) | | (11.46) | (15.77) | | (12.74) | (12.08) | | (14.36) | (9.03) | | (6.79) | (5.22) | | (2.60) | (6.79) | | (7.05) |
| Piped water systems | 0.76 | 1.48 | 0.19 | 3.36 | 2.91 | 4.24 | -1.44 | -1.44 | -2.66* | -4.69 | -0.99 | -4.71 | 0.15 | -0.98 | 0.09 | -14.09 | -19.94* | -10.84 | 27.60 | 25.20 | -47.80 |
| | (1.19) | (1.12) | (1.12) | (2.77) | (2.70) | (2.69) | (1.58) | (1.82) | (1.51) | (3.77) | (0.82) | (4.10) | (3.42) | (3.66) | (3.46) | (8.40) | (11.01) | (6.50) | (51.63) | (53.55) | (61.16) |
| Drainage and sewerage system | 22.37 | 30.17 | 10.23 | 4.55 | 4.22 | -4.71 | -18.50 | -18.64 | -24.66** | 0.76 | -3.16 | 5.27 | 12.74 | 13.42 | 9.36 | 7.94 | 14.12 | -1.79 | 86.41* | 74.53 | 92.09** |
| | (15.77) | (17.24) | (10.82) | (10.57) | (11.10) | (6.84) | (10.79) | (10.92) | (9.66) | (4.82) | (2.05) | (4.89) | (10.31) | (9.79) | (7.43) | (11.70) | (12.33) | (14.59) | (45.46) | (50.20) | (38.71) |
| Users public institutions | 11.35 | 11.56 | 11.94 | 12.13 | 12.38 | 13.61 | 8.75 | 8.43 | 9.11 | 5.83 | 6.70 | 3.79 | 2.37 | 1.79 | 2.50 | 9.12 | 8.89 | 8.33 | 13.39** | 12.24* | 17.19* |
| | (8.68) | (8.69) | (7.90) | (9.26) | (9.42) | (9.27) | (8.39) | (8.04) | (8.07) | (5.99) | (6.41) | (6.03) | (2.09) | (2.20) | (2.28) | (8.04) | (7.97) | (8.10) | (6.21) | (6.17) | (8.16) |
| Length of road network | -1.29 | -2.95 | 0.78 | -1.48 | -1.20 | -1.20 | -3.73 | -3.51 | -2.87 | 4.53** | 2.81 | 5.99** | -0.60 | -0.44 | -0.79 | 0.91* | 0.91** | 0.79 | -22.95 | -21.85 | -19.77 |
| | (3.08) | (3.26) | (2.85) | (0.86) | (0.74) | (0.88) | (2.25) | (2.04) | (1.98) | (1.62) | (2.46) | (2.23) | (0.69) | (0.83) | (0.66) | (0.45) | (0.41) | (0.59) | (14.89) | (14.68) | (11.73) |
| Tourists | 0.22 | 0.64 | -0.06 | -0.45** | -0.43** | -0.39 | -0.62* | -0.64* | -0.31 | -0.24 | 0.28 | 0.03 | -0.55 | -0.74 | -0.41 | 1.04** | 0.83** | 1.26** | 0.03 | 0.07 | 0.18 |
| | (1.19) | (1.32) | (0.97) | (0.21) | (0.18) | (0.24) | (0.33) | (0.30) | (0.39) | (0.46) | (0.38) | (0.35) | (0.39) | (0.52) | (0.35) | (0.43) | (0.37) | (0.52) | (0.41) | (0.40) | (0.48) |
| Electric energy users | 1.60 | 4.87 | -6.02 | -4.35 | -4.89 | -5.37 | 0.20 | 2.07 | -8.70 | -4.05 | 6.92 | 10.46 | 38.18** | 36.47** | 39.40** | -0.46 | -5.73 | -13.71 | -39.28 | -51.27 | -23.11 |
| | (5.28) | (5.21) | (6.46) | (10.35) | (9.55) | (10.71) | (18.16) | (15.99) | (16.47) | (22.46) | (15.77) | (27.59) | (14.66) | (12.62) | (14.32) | (22.05) | (20.22) | (16.45) | (43.12) | (58.13) | (38.78) |
| High school index | -1.63*** | -1.80*** | -1.14* | -0.66 | -0.59 | -0.94 | 1.16** | 1.06** | 0.62 | -0.20 | -0.43 | -0.13 | 0.27 | 0.45 | 0.42 | 1.25 | 1.29 | 1.15 | 0.28 | 0.23 | 1.22 |
| | (0.54) | (0.60) | (0.61) | (0.69) | (0.73) | (0.72) | (0.46) | (0.40) | (0.42) | (0.51) | (0.46) | (0.52) | (0.77) | (0.67) | (0.60) | (0.90) | (1.01) | (0.89) | (1.76) | (1.64) | (1.63) |
| Observations | 542 | 542 | 542 | 766 | 766 | 766 | 816 | 816 | 816 | 654 | 654 | 654 | 552 | 552 | 552 | 390 | 390 | 390 | 308 | 308 | 308 |
| Number of municipalities | 78 | 78 | 78 | 99 | 99 | 99 | 123 | 123 | 123 | 100 | 100 | 100 | 83 | 83 | 83 | 71 | 71 | 71 | 48 | 48 | 48 |
| R - squared | 0.526 | 0.518 | 0.506 | 0.418 | 0.414 | 0.380 | 0.331 | 0.330 | 0.303 | 0.204 | 0.0998 | 0.175 | 0.397 | 0.384 | 0.394 | 0.423 | 0.408 | 0.345 | 0.216 | 0.202 | 0.143 |
| F - statistic | 18766 | 76623 | 6265 | 59798 | 191533 | 41110 | 11096 | 27102 | 19524 | 290.1 | 8084 | 3673 | 166080 | 113307 | 148442 | 1693 | 6375 | 15554 | 1162 | 13384 | 790.5 |

Notes: Dependent variable is real gross revenue per capita annual percentage growth rate. All explanatory variables are lagged by one year. Annual data for 1994-2010. Group classification was done according to municipalities socioeconomic characteristics where Group 1 is the least developed and Group 7 is the most developed. All regressions also contain year dummies. SE are reported in parentheses. The estimators used are Fixed Effects and the Discroll and Kraay (1998) which accounts for fixed cross-sectional effects, autocorrelation, heteroskedasticity and cross sectional dependence. ***(**/*) denotes statistically significant at the 1%(5%/10%) level.

## Table 8.2 Income-Expenditure Employment Regression considering Cross Sectional Dependence for Municipalities in Mexico 1994-2010

| VARIABLES | Group 1 | | | Group 2 | | | Group 3 | | | Group 4 | | | Group 5 | | | Group 6 | | | Group 7 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Complete | Income | Expenditure | Complete | Income | Expenditure | Complete | Income | Expenditure | Complete | Income | Expenditure | Complete | Income | Expenditure | Complete | Income | Expenditure | Complete | Income | Expenditure |
| **Fiscal policy variables** | | | | | | | | | | | | | | | | | | | | | |
| **Revenue** | | | | | | | | | | | | | | | | | | | | | |
| Tax | 9.23*** | 7.55*** | | 8.87* | 8.62* | | 8.58*** | 5.56 | | -21.90 | -25.41* | | 19.23* | 17.94* | | 7.97 | 7.07 | | 7.41 | 7.34 | |
| | (2.35) | (1.65) | | (4.80) | (4.82) | | (2.54) | (4.10) | | (13.61) | (12.47) | | (9.42) | (10.13) | | (23.87) | (23.55) | | (32.56) | (28.18) | |
| Non-earmarked transfers | 1.69 | 1.20 | | 0.94** | 0.89** | | 7.67*** | 4.21** | | -3.87 | -6.14** | | -0.41 | -0.53 | | -9.56 | -10.69 | | -32.29 | -30.76 | |
| | (1.10) | (0.86) | | (0.37) | (0.35) | | (2.20) | (1.88) | | (3.74) | (2.60) | | (5.36) | (2.91) | | (11.49) | (11.70) | | (20.91) | (20.73) | |
| **Expenditure** | | | | | | | | | | | | | | | | | | | | | |
| Aquisition of movable and immovable goods | -3.53 | | -4.47 | 1.61 | | 0.48 | 1.46 | | -4.43 | 25.76 | | 25.74 | 15.83 | | 15.00 | -18.99 | | -16.44 | -14.13 | | -9.76 |
| | (2.84) | | (3.15) | (1.18) | | (0.76) | (4.98) | | (5.30) | (25.24) | | (24.65) | (15.55) | | (15.07) | (19.63) | | (18.62) | (15.92) | | (13.65) |
| Public infrastructure | 1.25* | | 0.23 | 0.13 | | -0.67 | 8.54** | | 5.22 | 9.18 | | 10.35 | -7.47 | | -7.39 | -0.85 | | 0.80 | -14.97 | | -11.25 |
| | (0.63) | | (0.23) | (0.38) | | (0.44) | (3.98) | | (3.83) | (12.34) | | (11.58) | (8.58) | | (6.49) | (5.47) | | (5.70) | (8.58) | | (7.72) |
| Other expenditure | -0.89 | | 0.03 | 0.59 | | 1.00 | -7.26*** | | -5.66** | -7.35 | | -10.02* | -15.90 | | -15.37** | -12.75 | | -16.52 | -6.00 | | -11.07 |
| | (0.79) | | (0.54) | (0.63) | | (0.66) | (1.99) | | (2.20) | (5.59) | | (4.93) | (9.15) | | (6.62) | (10.19) | | (11.41) | (26.59) | | (26.51) |
| **Control variables** | | | | | | | | | | | | | | | | | | | | | |
| Fiscal reform | 0.01*** | | 0.00*** | 0.01*** | | 0.01*** | 0.10*** | | 0.09*** | 0.24*** | | 0.25*** | 0.19*** | | 0.18*** | 0.24*** | | 0.23*** | 0.12*** | | 0.08*** |
| | (0.00) | | (0.00) | (0.00) | | (0.00) | (0.01) | | (0.01) | (0.01) | | (0.01) | (0.01) | | (0.01) | (0.03) | | (0.03) | (0.02) | | (0.03) |
| Recession dummy | 0.00 | | -0.00 | 0.00 | | -0.00 | -0.04*** | | -0.05*** | -0.24*** | | -0.24*** | -0.11*** | | -0.11*** | -0.39*** | | -0.37*** | -0.28*** | | -0.22*** |
| | (0.00) | | (0.00) | (0.00) | | (0.00) | (0.01) | | (0.00) | (0.02) | | (0.02) | (0.02) | | (0.01) | (0.04) | | (0.04) | (0.03) | | (0.02) |
| Piped water systems | 1.91* | 1.82* | 2.39** | 1.81** | 1.75** | 2.00** | -2.47 | -2.36 | -3.77 | 10.10 | 10.57 | 9.77 | 29.20** | 19.60 | 30.09** | 59.63* | 58.30* | 59.36* | 242.86** | 190.26* | 187.36 |
| | (0.96) | (0.96) | (1.04) | (0.83) | (0.76) | (0.85) | (2.92) | (3.47) | (3.50) | (7.54) | (8.48) | (7.83) | (13.68) | (14.16) | (13.28) | (31.91) | (29.94) | (30.89) | (112.60) | (106.78) | (124.66) |
| Drainage and sewerage system | -23.67*** | -24.55*** | -25.14*** | -4.70* | -4.27* | -5.83** | -2.81 | -6.56 | -1.81 | -11.59 | -13.80 | -12.02 | -216.62** | -206.36** | -223.65** | 32.18 | 28.20 | 33.89 | 213.72 | 212.35 | 192.48 |
| | (7.34) | (7.36) | (6.87) | (2.26) | (2.35) | (2.06) | (12.17) | (13.03) | (13.86) | (14.71) | (16.73) | (14.53) | (88.72) | (91.04) | (87.76) | (48.28) | (48.47) | (49.77) | (183.56) | (177.19) | (156.14) |
| Length of road network | 2.76 | 2.90 | 3.24 | 0.39 | 0.38 | 0.27 | -1.26 | -2.05 | -1.59 | -3.33 | -2.24 | -3.74 | -0.50 | 0.13 | -0.40 | 0.20 | -0.40 | 0.26 | -41.45 | -43.12 | -29.56 |
| | (1.83) | (1.82) | (2.02) | (2.13) | (2.12) | (2.13) | (2.62) | (2.66) | (2.68) | (13.53) | (14.16) | (13.49) | (2.66) | (2.28) | (2.46) | (3.21) | (2.96) | (3.18) | (24.05) | (28.43) | (19.31) |
| New trucks sold | 3.78 | 2.47 | 2.20 | 13.18*** | 12.99*** | 13.76*** | -7.03 | -6.44 | -4.45 | 16.70*** | 15.47*** | 16.97*** | -3.77 | -2.72 | -0.22 | 28.45** | 28.95*** | 27.94** | 1.34 | 2.08 | 1.87 |
| | (6.27) | (6.42) | (6.80) | (2.78) | (2.84) | (2.78) | (9.76) | (9.92) | (9.81) | (3.24) | (4.78) | (3.18) | (7.83) | (7.20) | (6.46) | (9.79) | (9.04) | (10.06) | (2.23) | (2.02) | (2.74) |
| High school index | -0.45** | -0.42** | -0.39** | -0.77*** | -0.77*** | -0.82*** | -2.73* | -3.18* | -3.12* | -1.10 | -1.30 | -1.22 | 2.51 | 1.35 | 2.80 | 2.43 | 1.51 | 2.20 | 7.60 | 7.61 | 6.29 |
| | (0.19) | (0.17) | (0.18) | (0.12) | (0.12) | (0.13) | (1.55) | (1.68) | (1.59) | (2.39) | (2.55) | (2.31) | (2.48) | (2.56) | (2.58) | (5.82) | (6.09) | (5.98) | (22.77) | (22.89) | (22.23) |
| Observations | 659 | 659 | 659 | 787 | 787 | 787 | 849 | 849 | 849 | 1,975 | 1,975 | 1,975 | 619 | 619 | 619 | 1,346 | 1,346 | 1,346 | 537 | 537 | 537 |
| Number of municipalities | 56 | 56 | 56 | 94 | 94 | 94 | 128 | 128 | 128 | 208 | 208 | 208 | 100 | 100 | 100 | 207 | 207 | 207 | 78 | 78 | 78 |
| R - squared | 0.163 | 0.157 | 0.152 | 0.0981 | 0.0968 | 0.0895 | 0.104 | 0.0900 | 0.0925 | 0.193 | 0.185 | 0.191 | 0.129 | 0.116 | 0.124 | 0.139 | 0.137 | 0.138 | 0.120 | 0.116 | 0.106 |
| F - statistic | 5226 | 39181 | 11383 | 528.1 | 7502 | 28126 | 111603 | 449735 | 22432 | 62815 | 30027 | 218479 | 38068 | 127076 | 112255 | 2730 | 29814 | 51416 | 14015 | 36565 | 2268 |

Notes: Dependent variable is employment rate. All explanatory variables are lagged by one year. Annual data for 1994-2010. Group classification was done according to municipalities socioeconomic characteristics where Group 1 is the least developed and Group 7 is the most developed. All regressions also contain year dummies. SE are reported in parentheses. The estimators used are Fixed Effects and the Discroll and Kraay (1998) which accounts for fixed cross-sectional effects, autocorrelation, heteroskedasticity and cross sectional dependence. ***(**/*) denotes statistically significant at the 1%(5%/10%) level.

# 9. Appendix C. Latin America, Additional Tables

**Table 9.1 Income-Expenditure Growth Regression across Latin American countries, Central Government, 1994-2010**

| | Baseline specification | Income | Expenditure |
|---|---|---|---|
| **VARIABLES** | (1) | (2) | (3) |
| **Fiscal policy variables** | | | |
| **Revenue** | | | |
| Direct tax (Corporate) | -208.85<br>(264.87) | -0.88<br>(0.67) | |
| Indirect tax | -42.87<br>(75.44) | -1.15**<br>(0.45) | |
| **Expenditure** | | | |
| Aquisition of fixed assets | -0.62***<br>(0.21) | | -0.40*<br>(0.21) |
| Capital transfers | 0.37*<br>(0.21) | | 0.44**<br>(0.17) |
| **Control variables** | | | |
| Real gdp per capita | -3.36<br>(4.05) | -2.73<br>(2.40) | -3.68<br>(2.69) |
| Life expectancy | 23.92<br>(23.44) | 18.11<br>(15.81) | 30.65*<br>(16.03) |
| Population growth | -94.32<br>(91.35) | 66.12**<br>(30.25) | -65.57<br>(51.33) |
| Primary education enrollment | -3.44***<br>(0.58) | -3.43***<br>(0.56) | -3.66***<br>(0.51) |
| Observations | 175 | 226 | 205 |
| Number of countries | 13 | 17 | 15 |
| F - statistic | 15601*** | 858040*** | 18484*** |
| R - squared | 0.549 | 0.494 | 0.499 |

Notes: Dependent variable is real GDP per capita annual percentage growth rate. All explanatory variables are lagged by one year. Annual data fo 1994-2010. All regressions also contain year dummies. Standard errors, adjusted for clustering at the country level, are reported in parentheses. Th estimators used are Fixed Effects and the Discroll and Kraay (1998) which accounts for fixed cross-sectional effects, autocorrelation heteroskedasticity and cross sectional dependence. ***(**/*) denotes statistically significant at the 1%(5%/10%). Countries included are Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua Panama, Paraguay, Peru, Uruguay, Venezuela

**Table 9.2 Income-Expenditure Growth Regression across Latin American countries, General Government, 1994-2010**

| | Baseline specification | Income | Expenditure |
|---|---|---|---|
| **VARIABLES** | (1) | (2) | (3) |
| **Fiscal policy variables** | | | |
| **Revenue** | | | |
| Taxes on income | -0.02<br>(0.01) | -0.02<br>(0.02) | |
| Taxes on payroll | -0.00<br>(0.08) | -0.06<br>(0.05) | |
| Other taxes | -0.04<br>(0.12) | -0.05<br>(0.13) | |
| **Expenditure** | | | |
| Government consumption | -0.03<br>(0.02) | | -0.02***<br>(0.01) |
| **Control variables** | | | |
| Real gdp per capita | -2.43<br>(4.28) | -0.89<br>(4.21) | -2.79<br>(2.42) |
| Life expectancy | 28.47<br>(25.99) | 9.64<br>(21.08) | 8.40<br>(13.51) |
| Population growth | 41.59<br>(99.02) | 88.55<br>(81.61) | 61.15<br>(42.61) |
| Primary education enrollment | -3.07***<br>(1.01) | -3.83***<br>(0.71) | -2.49***<br>(0.69) |
| Observations | 129 | 129 | 261 |
| Number of countries | 9 | 9 | 19 |
| F - statistic | 9.508e+06*** | 12132*** | 43845*** |
| R - squared | 0.486 | 0.462 | 0.492 |

Notes: Dependent variable is real GDP per capita annual percentage growth rate. All explanatory variables are lagged by one year. Annual data for 1994-2010. All regressions also contain year dummies. Standard errors, adjusted for clustering at the country level, are reported in parentheses. The estimators used are Fixed Effects and the Discroll and Kraay (1998) which accounts for fixed cross-sectional effects, autocorrelation, heteroskedasticity and cross sectional dependence. ***(**/*) denotes statistically significant at the 1%(5%/10%). Countries included are: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela

**Table 9.3 Income-Expenditure Unemployment Regression across Latin American countries, Central Government, 1994-2010**

| | Baseline specification | Income | Expenditure |
|---|---|---|---|
| **VARIABLES** | (1) | (2) | (3) |
| **Fiscal policy variables** | | | |
| **Revenue** | | | |
| Direct tax (Corporate) | 0.08<br>(0.06) | -0.00***<br>(0.00) | |
| Indirect tax | -0.69<br>(3.08) | 0.01<br>(0.01) | |
| **Expenditure** | | | |
| Aquisition of fixed assets | -0.05<br>(0.06) | | -0.12**<br>(0.04) |
| Real gdp per capita | -0.85*<br>(0.43) | -1.26***<br>(0.36) | -0.60*<br>(0.33) |
| **Control variables** | | | |
| Minimum wage | -33.70***<br>(10.97) | -31.12***<br>(10.34) | -32.82***<br>(8.95) |
| Life expectancy | 12.18**<br>(4.18) | 18.38***<br>(3.47) | 15.00***<br>(3.56) |
| Population growth | 3.51<br>(18.49) | -35.00***<br>(10.82) | -16.69<br>(19.25) |
| Primary education enrollment | 0.22<br>(0.21) | 0.18<br>(0.16) | 0.09<br>(0.10) |
| Observations | 147 | 175 | 174 |
| Number of countries | 13 | 15 | 15 |
| F - statistic | 9984*** | 28998*** | 4466*** |
| R - squared | 0.447 | 0.541 | 0.388 |

Notes: Dependent variable is Unemployment rate. All explanatory variables are lagged by one year. Annual data for 1994-2010. All regressions also contain year dummies. Standard errors, adjusted for clustering at the country level, are reported in parentheses. The estimators used are Fixed Effects and the Discroll and Kraay (1998) which accounts for fixed cross-sectional effects, autocorrelation, heteroskedasticity and cross sectional dependence. ***(**/*) denotes statistically significant at the 1%(5%/10%). Countries included are: Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela

## Table 9.4 Income-Expenditure Unemployment Regression across Latin American countries, General Government, 1994-2010

| | Baseline specification | Income | Expenditure |
|---|---|---|---|
| **VARIABLES** | (1) | (2) | (3) |
| **Fiscal policy variables** | | | |
| **Revenue** | | | |
| Taxes on income | 0.20<br>(1.65) | -1.03<br>(1.73) | |
| Taxes on payroll | -1.36<br>(1.89) | 0.85<br>(2.62) | |
| Other taxes | 8.63***<br>(2.18) | 9.52***<br>(1.73) | |
| **Expenditure** | | | |
| Government consumption | 0.97***<br>(0.16) | | 0.44**<br>(0.17) |
| **Control variables** | | | |
| Real gdp per capita | -0.11<br>(0.82) | -0.69<br>(1.05) | -0.95**<br>(0.38) |
| Minimum wage | -58.92***<br>(11.83) | -37.00***<br>(10.50) | -34.86**<br>(12.53) |
| Life expectancy | 10.14*<br>(4.86) | 13.44**<br>(4.80) | 19.74***<br>(3.78) |
| Population growth | 14.56<br>(23.30) | -20.22<br>(28.10) | -29.23*<br>(15.35) |
| Primary education enrollment | -0.05<br>(0.15) | 0.15<br>(0.15) | -0.00<br>(0.12) |
| Observations | 111 | 111 | 203 |
| Number of countries | 9 | 9 | 17 |
| F - statistic | 13790*** | 534083*** | 288902*** |
| R - squared | 0.672 | 0.562 | 0.524 |

Notes: Dependent variable is Unemployment rate. All explanatory variables are lagged by one year. Annual data for 1994-2010. All regressions also contain year dummies. Standard errors, adjusted for clustering at the country level, are reported in parentheses. The estimators used are Fixed Effects and the Discroll and Kraay (1998) which accounts for fixed cross-sectional effects, autocorrelation, heteroskedasticity and cross sectional dependence. ***(**/*) denotes statistically significant at the 1%(5%/10%). Countries included are: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela

# 10. Appendix D. Self-developed Survey

**Table 10.1 Survey to Public Government Officials**

My name is Lizbeth Pérez Fuentes Alemán and I am currently a PhD in economics student at the University of Bath, England. I am a graduate in economics and public accountancy by the ITAM and earned an MBA at Alliant University of California. I have more than 15 years of experience in fiscal matters, because I worked in the Ministry of Finance and the Secretariats of Finance of Veracruz and Mexico City.

My thesis discusses the evolution of income and expenditures and their impact on the growth of the gross domestic product per capita at the state level. It is important for my study to know the opinion of the tax officials with regard to various taxes and expenses, in order to have direct information of decision makers. Therefore, I request you to kindly support me in answering this survey. The individual results of my survey are anonymous. My study will be at your disposal.

**1. Effect of Direct Taxes on GDP per capita growth in your State:**

☐ Very significant ☐ Significant ☐ Slightly significant ☐ Not significant

**2. Effect of Indirect Taxes on GDP per capita growth in your State:**

☐ Very significant ☐ Significant ☐ Slightly significant ☐ Not significant

**3. Effect of Own-source Income on GDP per capita growth in your State:**

☐ Very significant ☐ Significant ☐ Slightly significant ☐ Not significant

**4. Effect of Transfers on GDP per capita growth in your State:**

☐ Very significant ☐ Significant ☐ Slightly significant ☐ Not significant

**5. Effect of Current Expenditure on GDP per capita growth in your State:**

☐ Very significant ☐ Significant ☐ Slightly significant ☐ Not significant

**6. Effect of Capital Expenditure on GDP per capita growth in your State:**

☐ Very significant ☐ Significant ☐ Slightly significant ☐ Not significant

**7. Effect of Federal Fiscal Policy on GDP per capita growth in your State:**

☐ Very significant ☐ Significant ☐ Slightly significant ☐ Not significant

**8. Use of local taxing power in your State:**

☐ Very significant ☐ Significant ☐ Slightly significant ☐ Not significant

**Rank or position:**

☐ Advisor ☐ Director ☐ Undersecretary ☐ Secretary

**Years of Experience:**

☐ Up to 3 years ☐ 4 to 6 years ☐ 7 to 10 years ☐ More than 11 years

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